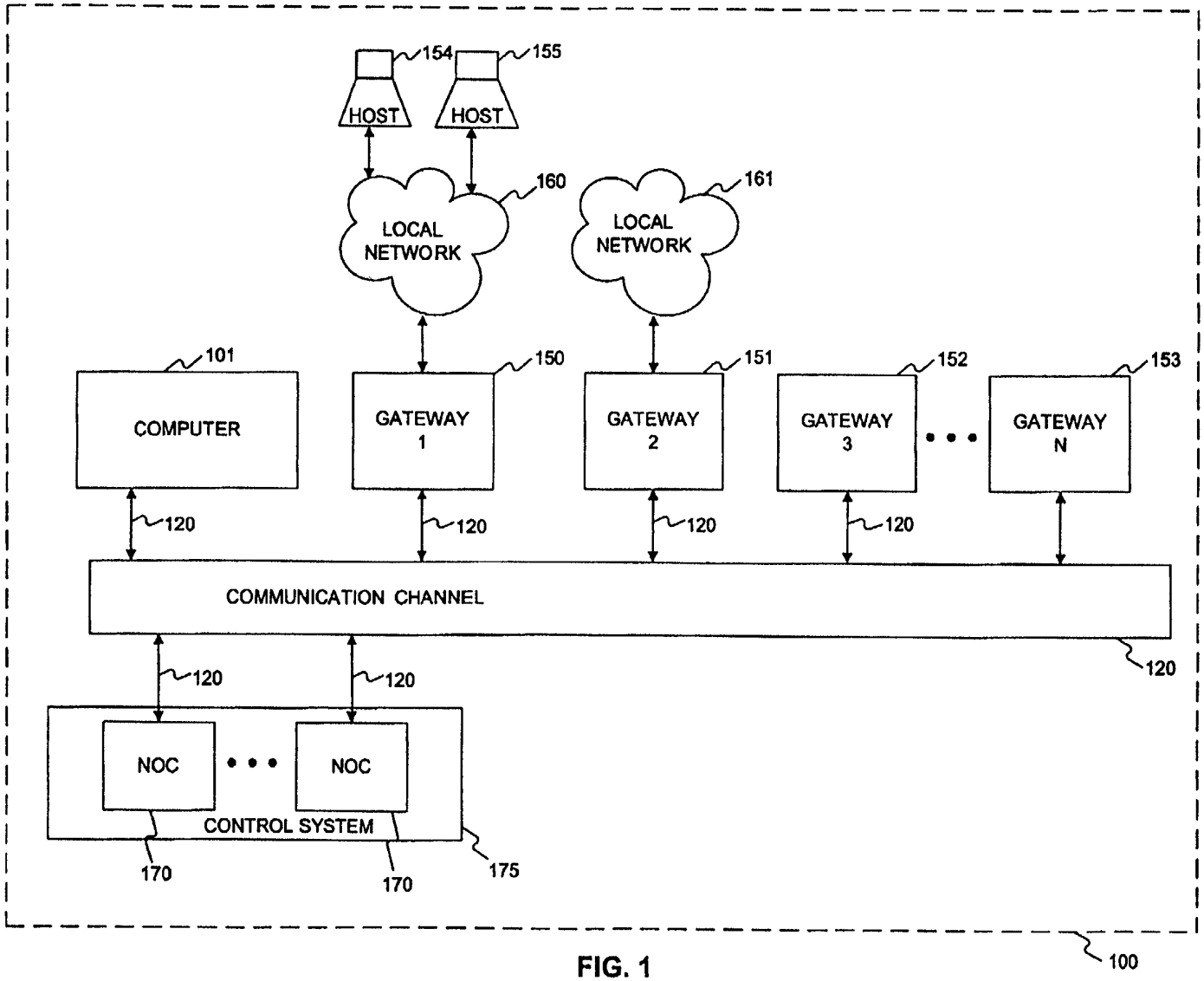

154
155
HOST
HOST
160
161
LOCAL NETWORK
LOCAL NETWORK
101
150
151
152
153
COMPUTER
GATEWAY 1
GATEWAY 2
GATEWAY 3
GATEWAY N
120
120
120
120
120
COMMUNICATION CHANNEL
120
120
120
NOC
NOC
CONTROL SYSTEM
170
170
175
100

FIG. 1

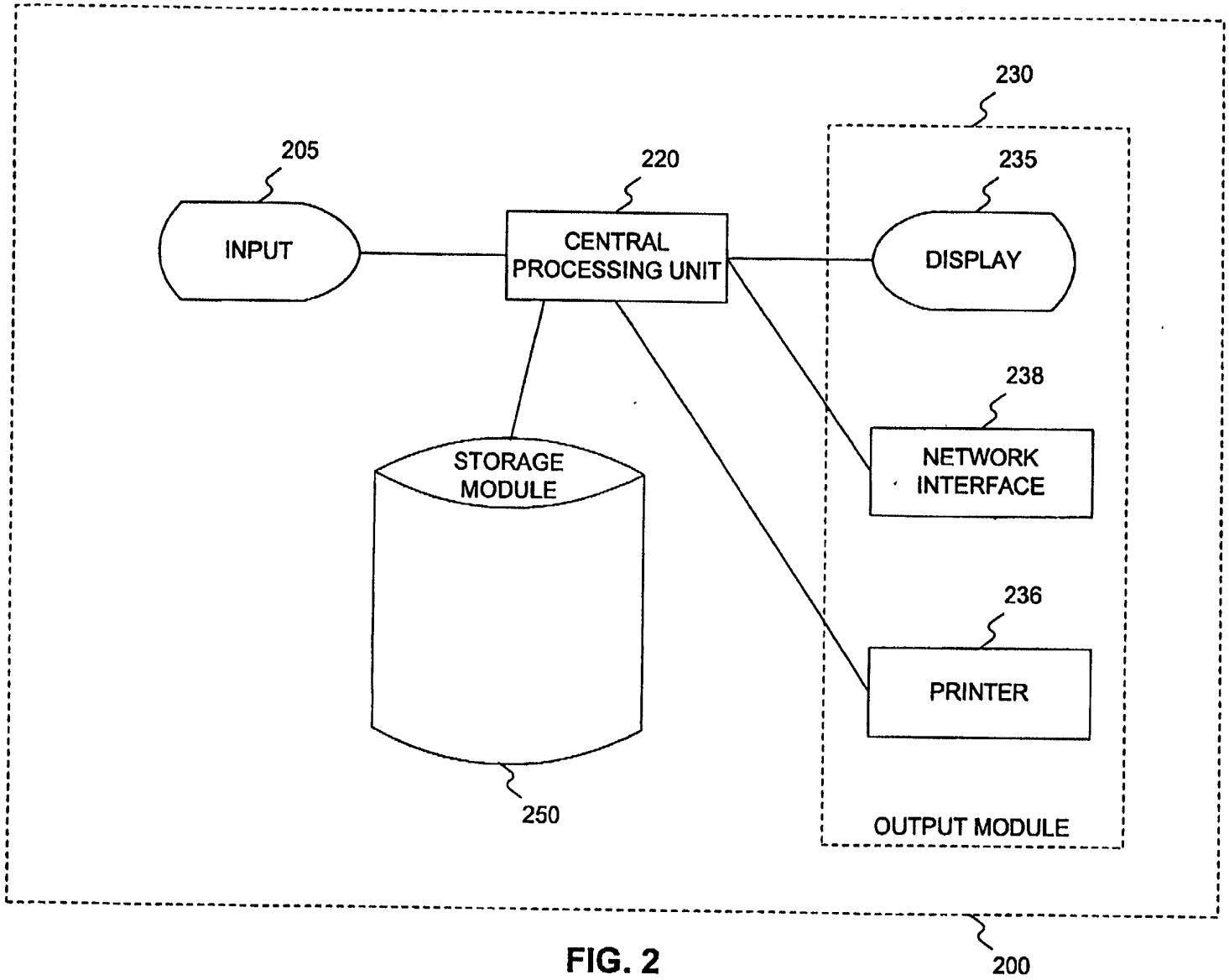

230
205
220
235
INPUT
CENTRAL PROCESSING UNIT
DISPLAY
238
NETWORK INTERFACE
STORAGE MODULE
236
PRINTER
250
OUTPUT MODULE
200

FIG. 2

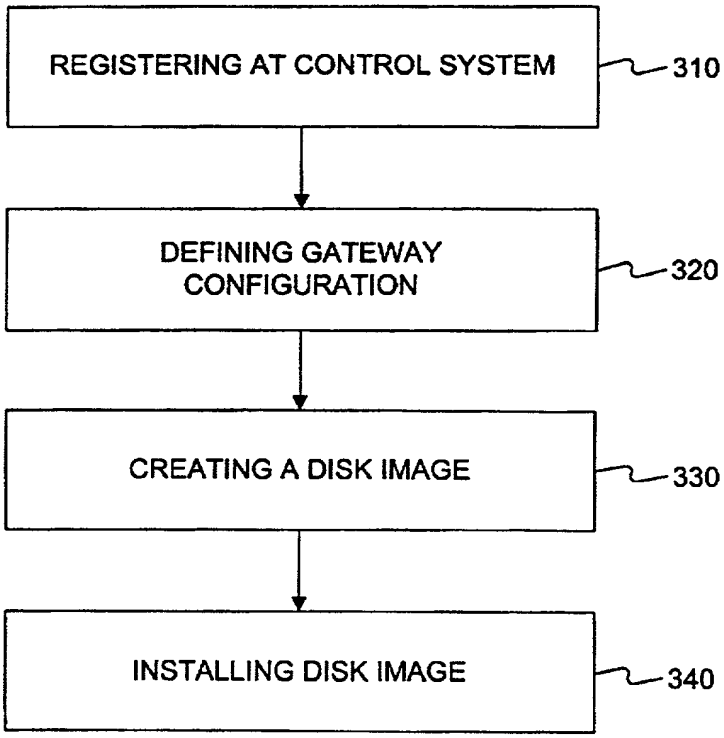

REGISTERING AT CONTROL SYSTEM
310
DEFINING GATEWAY CONFIGURATION
320
CREATING A DISK IMAGE
330
INSTALLING DISK IMAGE
340

FIG. 3

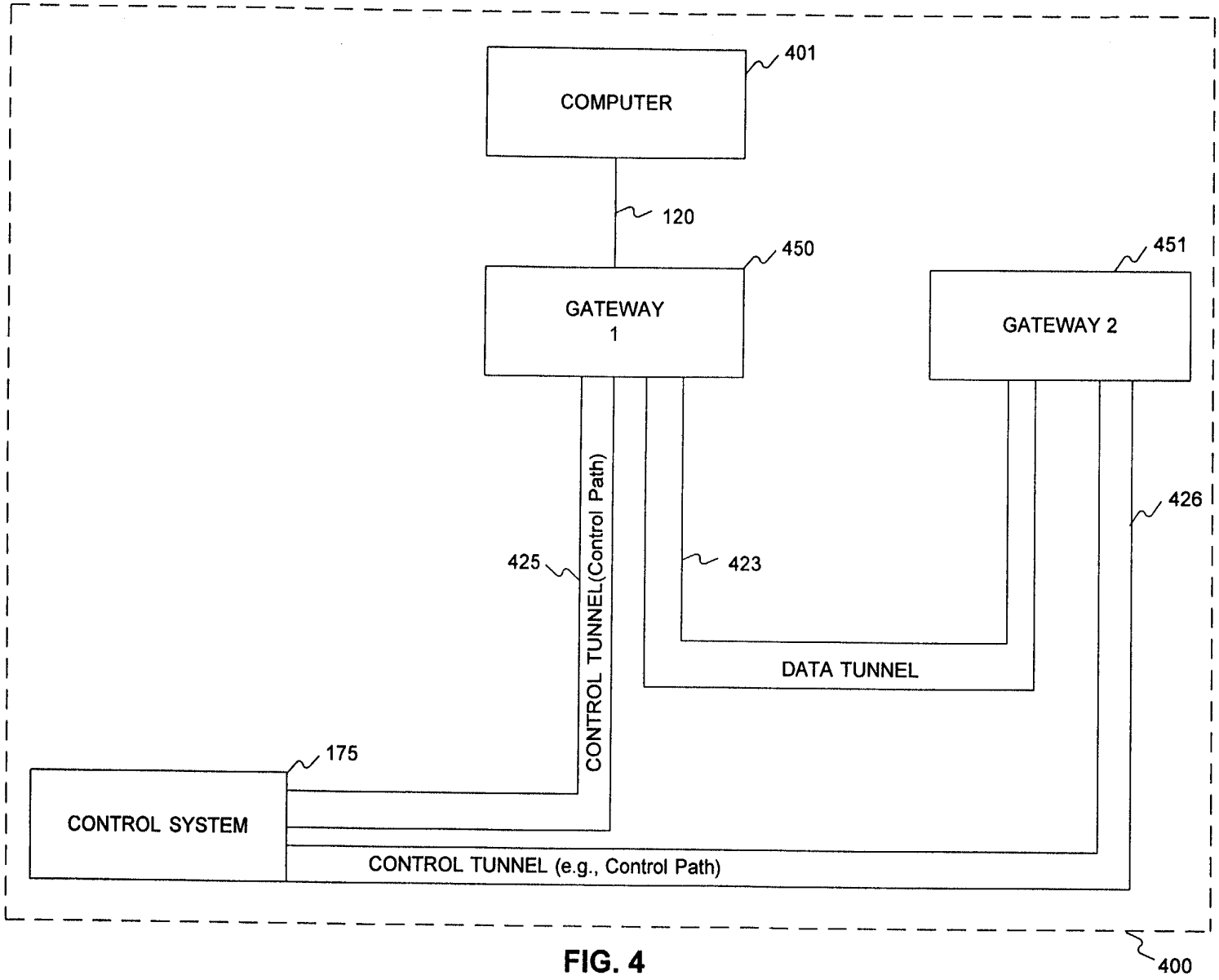

COMPUTER
401
120
GATEWAY 1
450
GATEWAY 2
451
426
425
CONTROL TUNNEL(Control Path)
423
DATA TUNNEL
175
CONTROL SYSTEM
CONTROL TUNNEL (e.g., Control Path)
400

FIG. 4

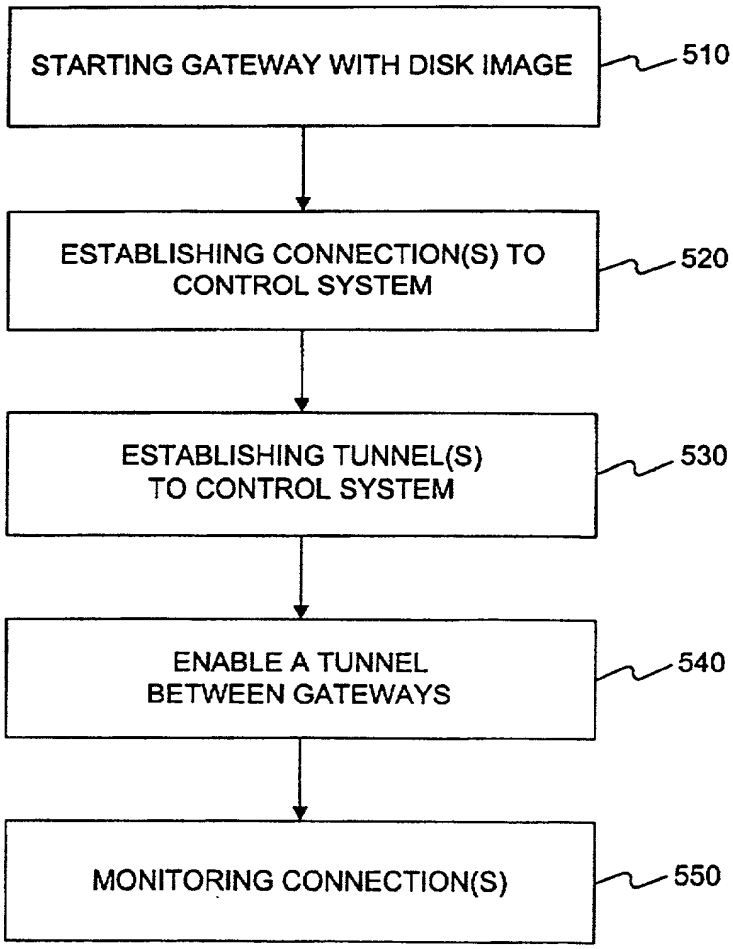

STARTING GATEWAY WITH DISK IMAGE
510
ESTABLISHING CONNECTION(S) TO CONTROL SYSTEM
520
ESTABLISHING TUNNEL(S) TO CONTROL SYSTEM
530
ENABLE A TUNNEL BETWEEN GATEWAYS
540
MONITORING CONNECTION(S)
550

FIG. 5

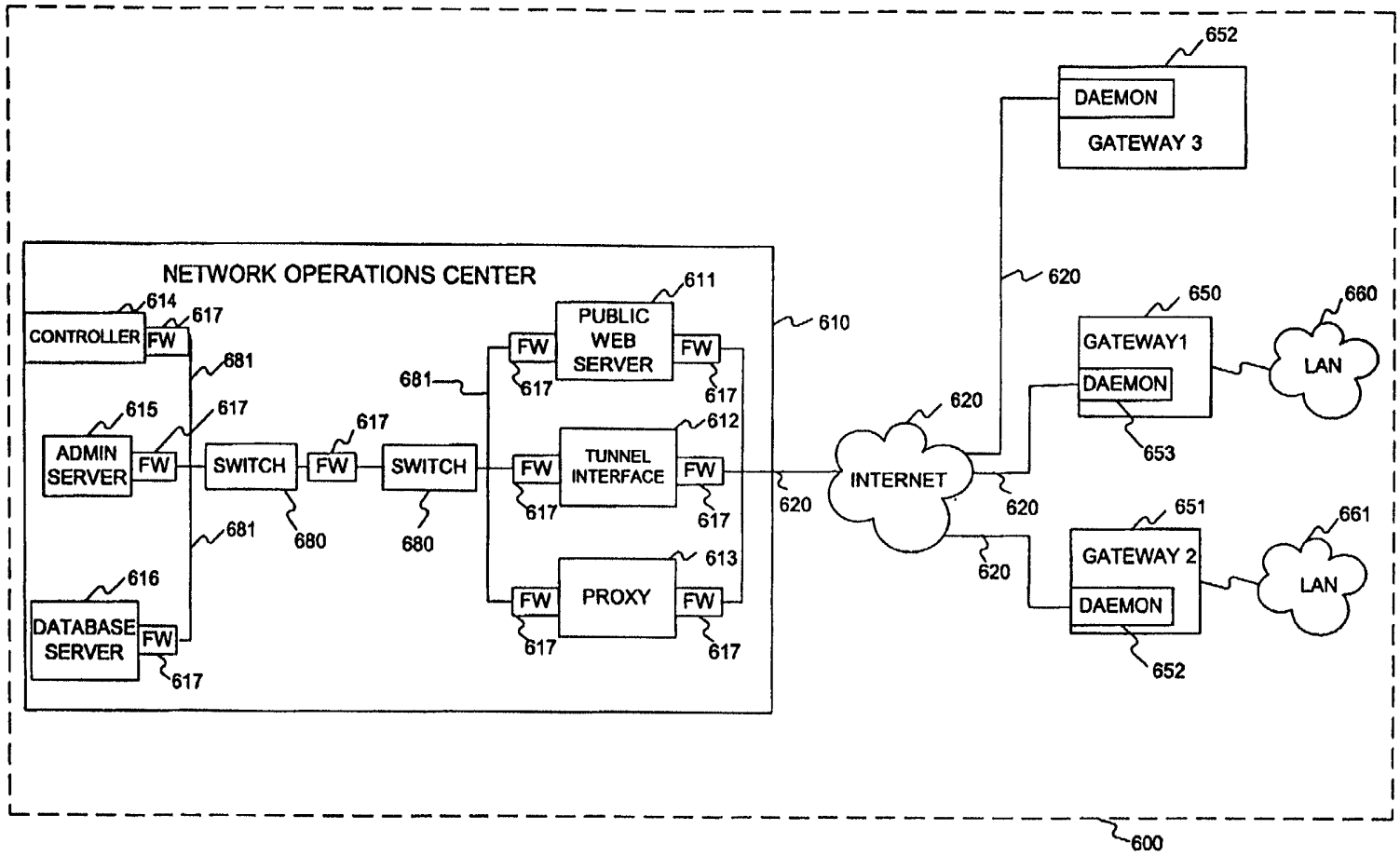

NETWORK OPERATIONS CENTER
CONTROLLER
FW
614
617
681
ADMIN SERVER
615
SWITCH
680
DATABASE SERVER
616
PUBLIC WEB SERVER
611
TUNNEL INTERFACE
612
PROXY
613
610
INTERNET
620
DAEMON
GATEWAY 3
652
GATEWAY1
650
LAN
660
653
GATEWAY 2
651
661
600

FIG. 6A

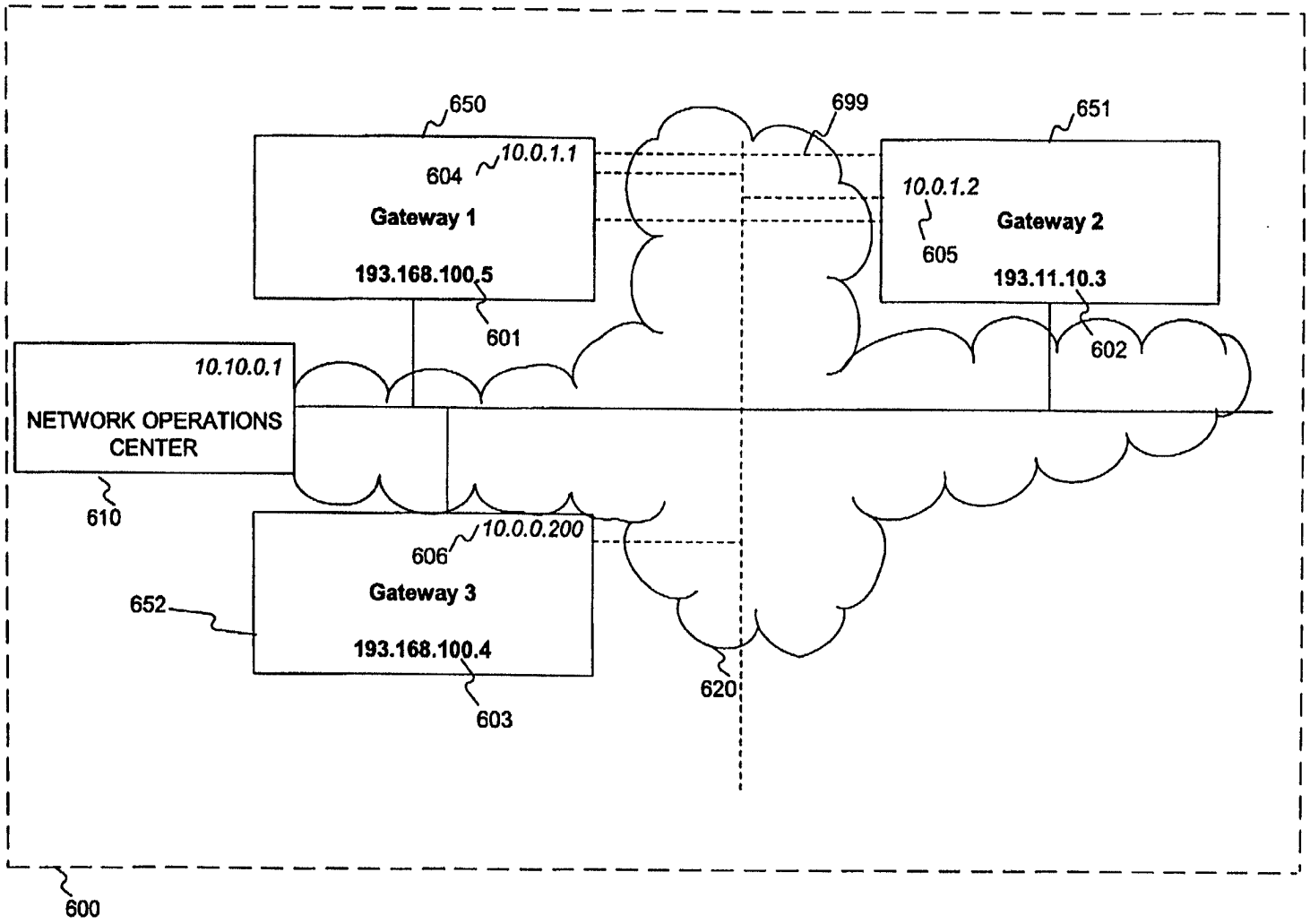

650
699
651
10.0.1.1
604
Gateway 1
193.168.100.5
601
10.0.1.2
605
Gateway 2
193.11.10.3
602
10.10.0.1
NETWORK OPERATIONS CENTER
610
10.0.0.200
606
Gateway 3
652
193.168.100.4
603
620
600

FIG. 6B

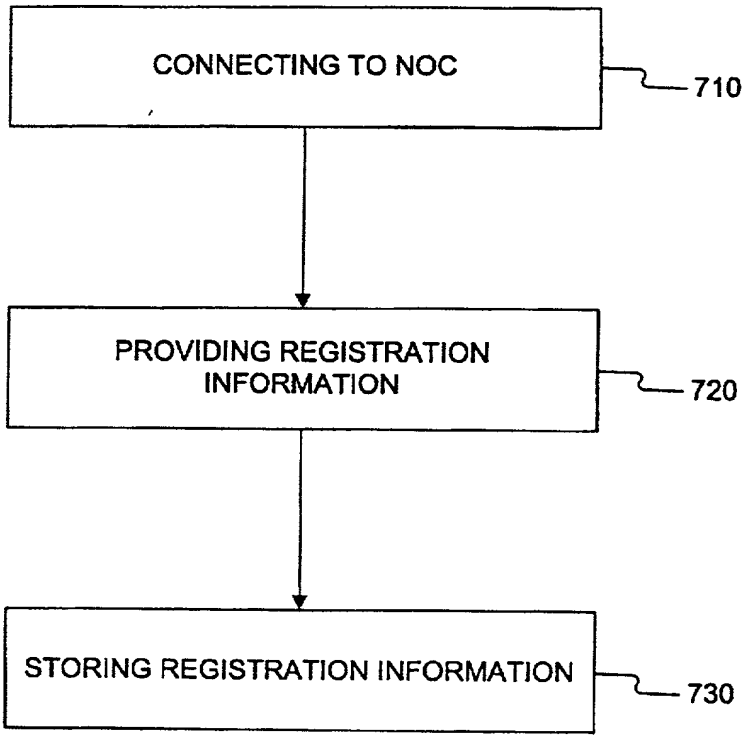

CONNECTING TO NOC
710
PROVIDING REGISTRATION INFORMATION
720
STORING REGISTRATION INFORMATION
730

FIG. 7

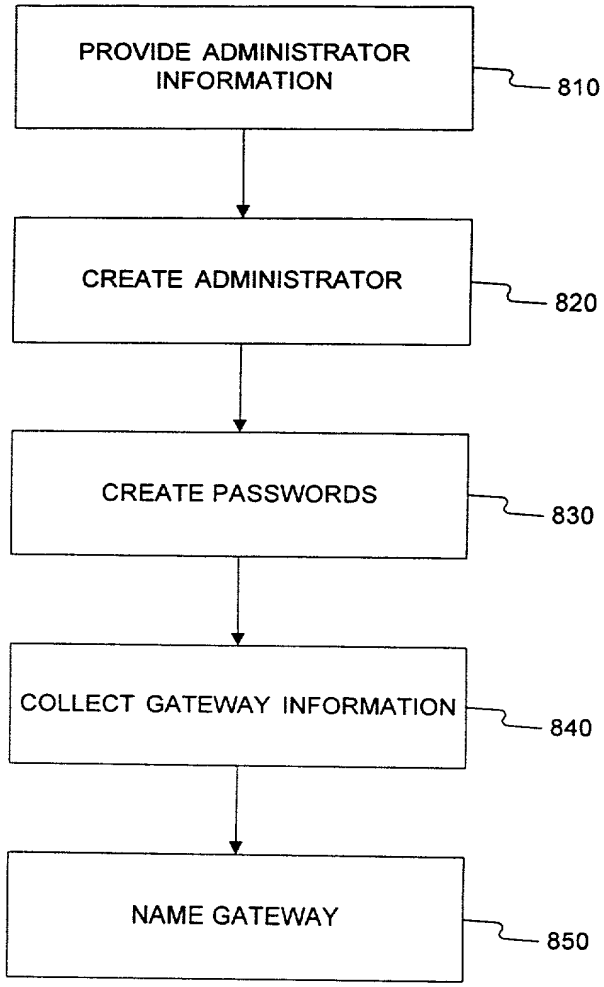

PROVIDE ADMINISTRATOR INFORMATION
810
CREATE ADMINISTRATOR
820
CREATE PASSWORDS
830
COLLECT GATEWAY INFORMATION
840
NAME GATEWAY
850

FIG. 8

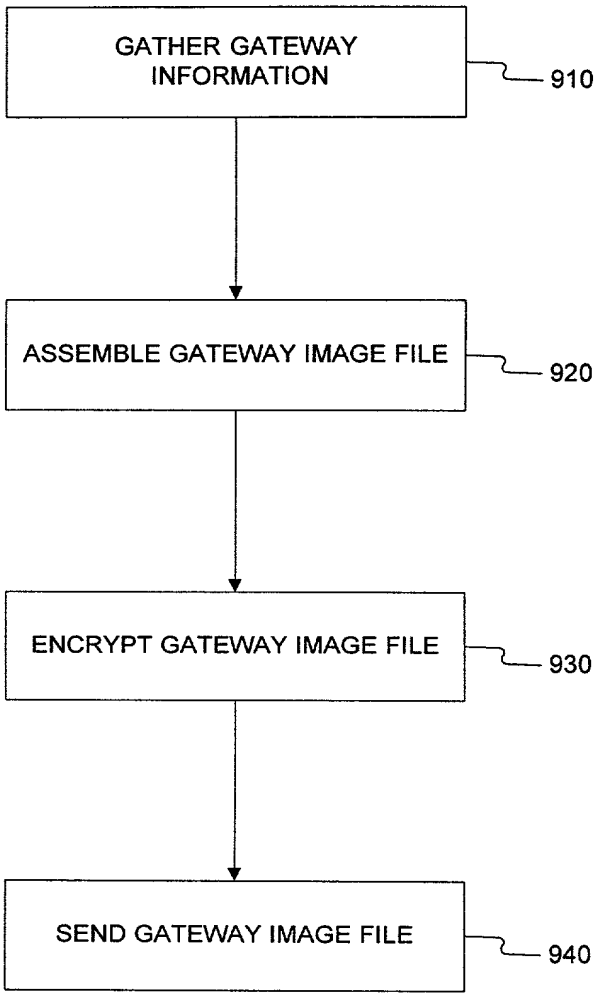

GATHER GATEWAY INFORMATION
910
ASSEMBLE GATEWAY IMAGE FILE
920
ENCRYPT GATEWAY IMAGE FILE
930
SEND GATEWAY IMAGE FILE
940

FIG. 9A

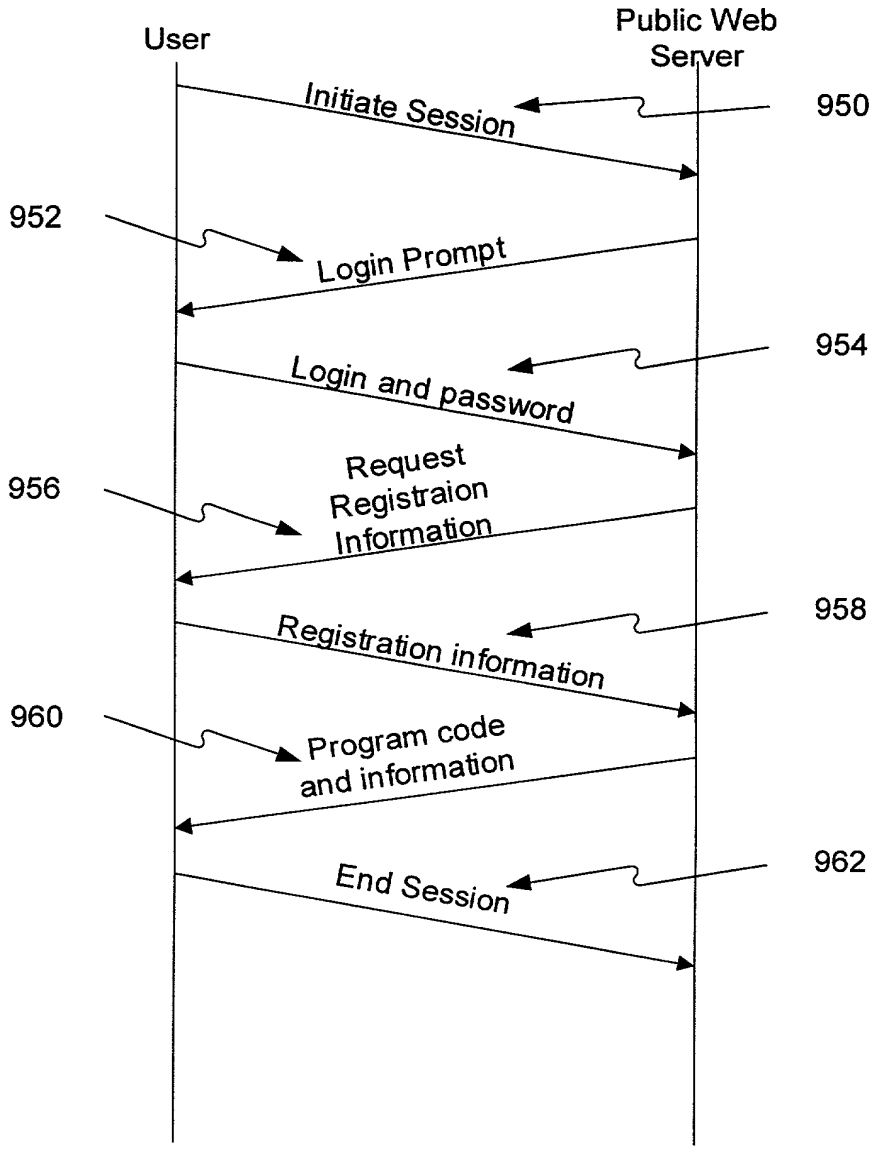

User
Public Web Server
Initiate Session
950
952
Login Prompt
954
Login and password
Request Registraion Information
956
958
Registration information
960
Program code and information
962
End Session

FIG. 9B

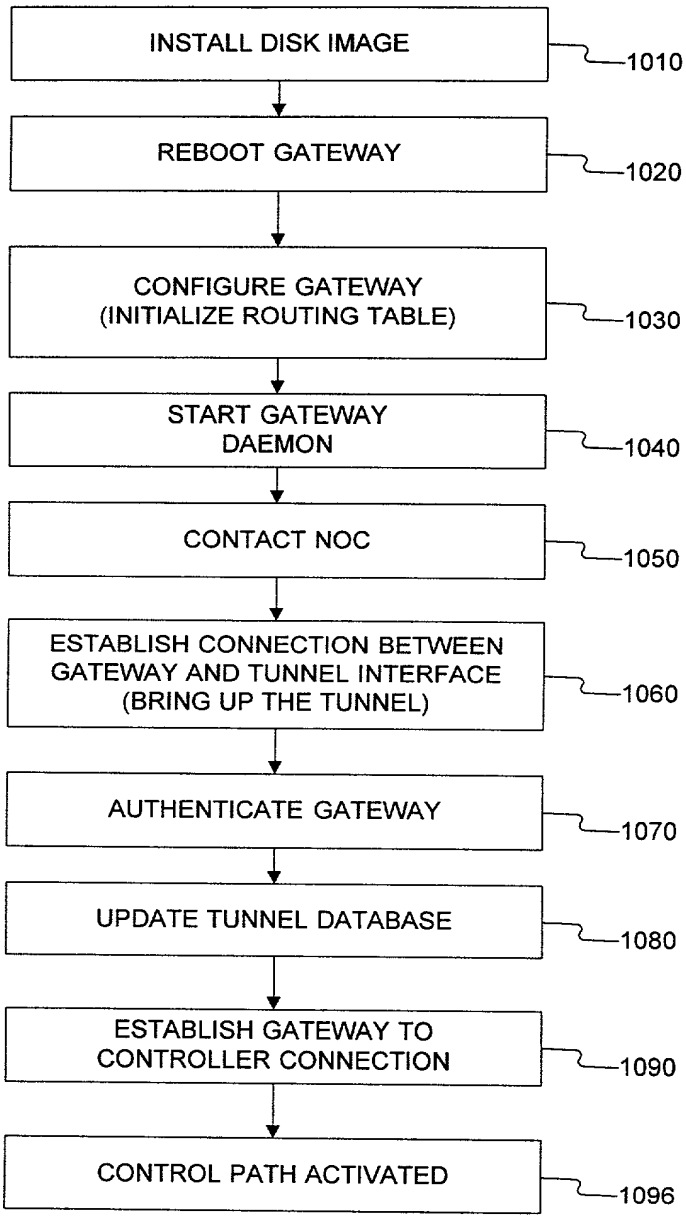

INSTALL DISK IMAGE
1010
REBOOT GATEWAY
1020
CONFIGURE GATEWAY
(INITIALIZE ROUTING TABLE)
1030
START GATEWAY
DAEMON
1040
CONTACT NOC
1050
ESTABLISH CONNECTION BETWEEN
GATEWAY AND TUNNEL INTERFACE
(BRING UP THE TUNNEL)
1060
AUTHENTICATE GATEWAY
1070
UPDATE TUNNEL DATABASE
1080
ESTABLISH GATEWAY TO
CONTROLLER CONNECTION
1090
CONTROL PATH ACTIVATED
1096

FIG. 10A

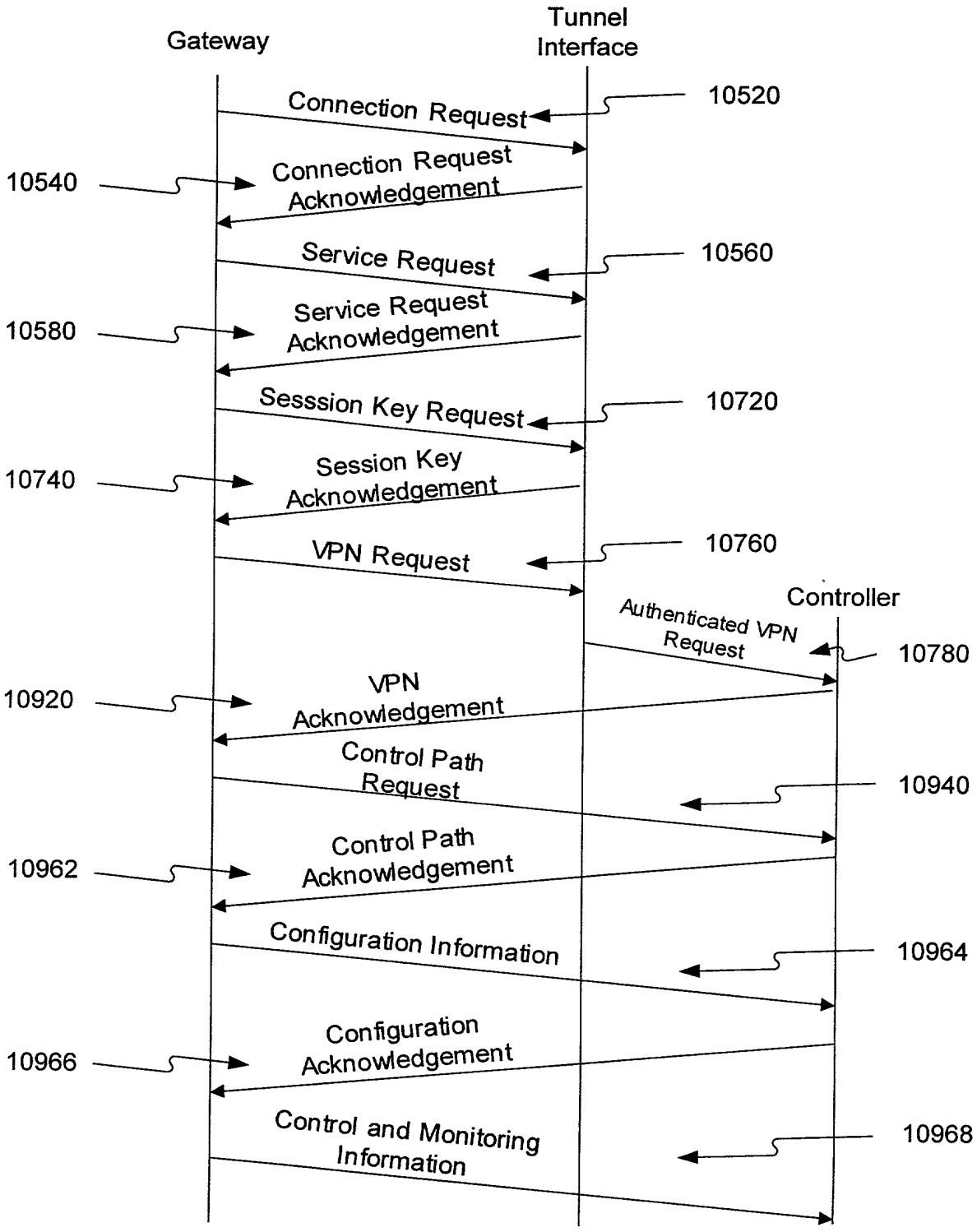

Gateway
Tunnel Interface
Connection Request
10520
10540
Connection Request Acknowledgement
Service Request
10560
10580
Service Request Acknowledgement
Sesssion Key Request
10720
10740
Session Key Acknowledgement
VPN Request
10760
Controller
Authenticated VPN Request
10780
10920
VPN Acknowledgement
Control Path Request
10940
10962
Control Path Acknowledgement
Configuration Information
10964
10966
Configuration Acknowledgement
Control and Monitoring Information
10968

FIG. 10B

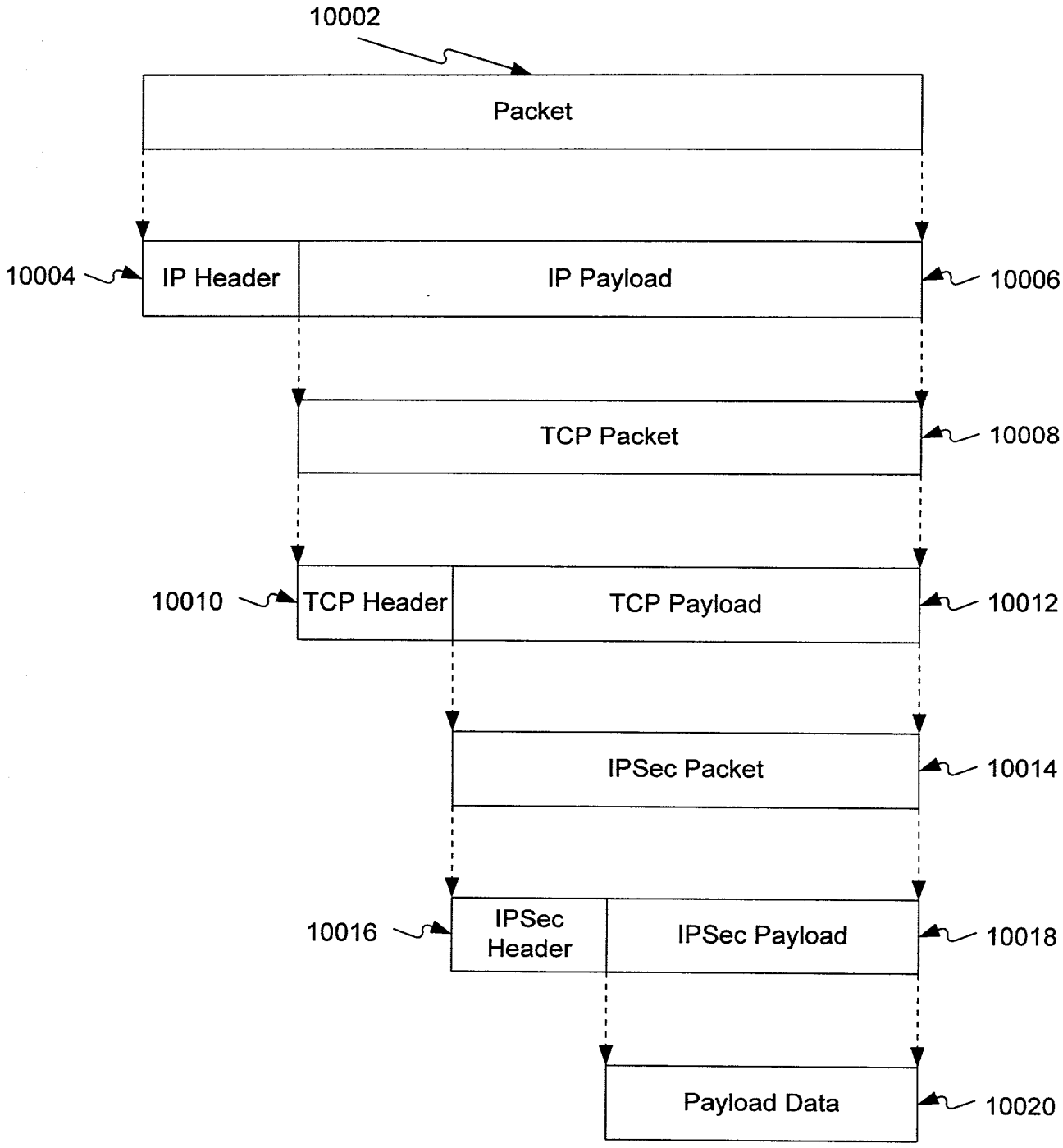

10002
Packet
10004
IP Header
IP Payload
10006
TCP Packet
10008
10010
TCP Header
TCP Payload
10012
IPSec Packet
10014
10016
IPSec Header
IPSec Payload
10018
Payload Data
10020

FIG. 10C

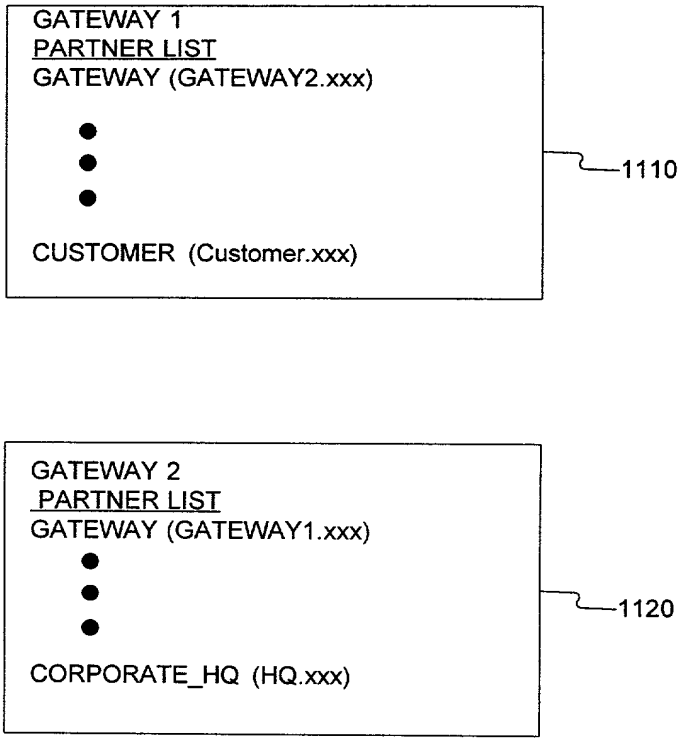

GATEWAY 1
PARTNER LIST
GATEWAY (GATEWAY2.xxx)
CUSTOMER (Customer.xxx)
1110
GATEWAY 2
PARTNER LIST
GATEWAY (GATEWAY1.xxx)
CORPORATE_HQ (HQ.xxx)
1120

FIG. 11A

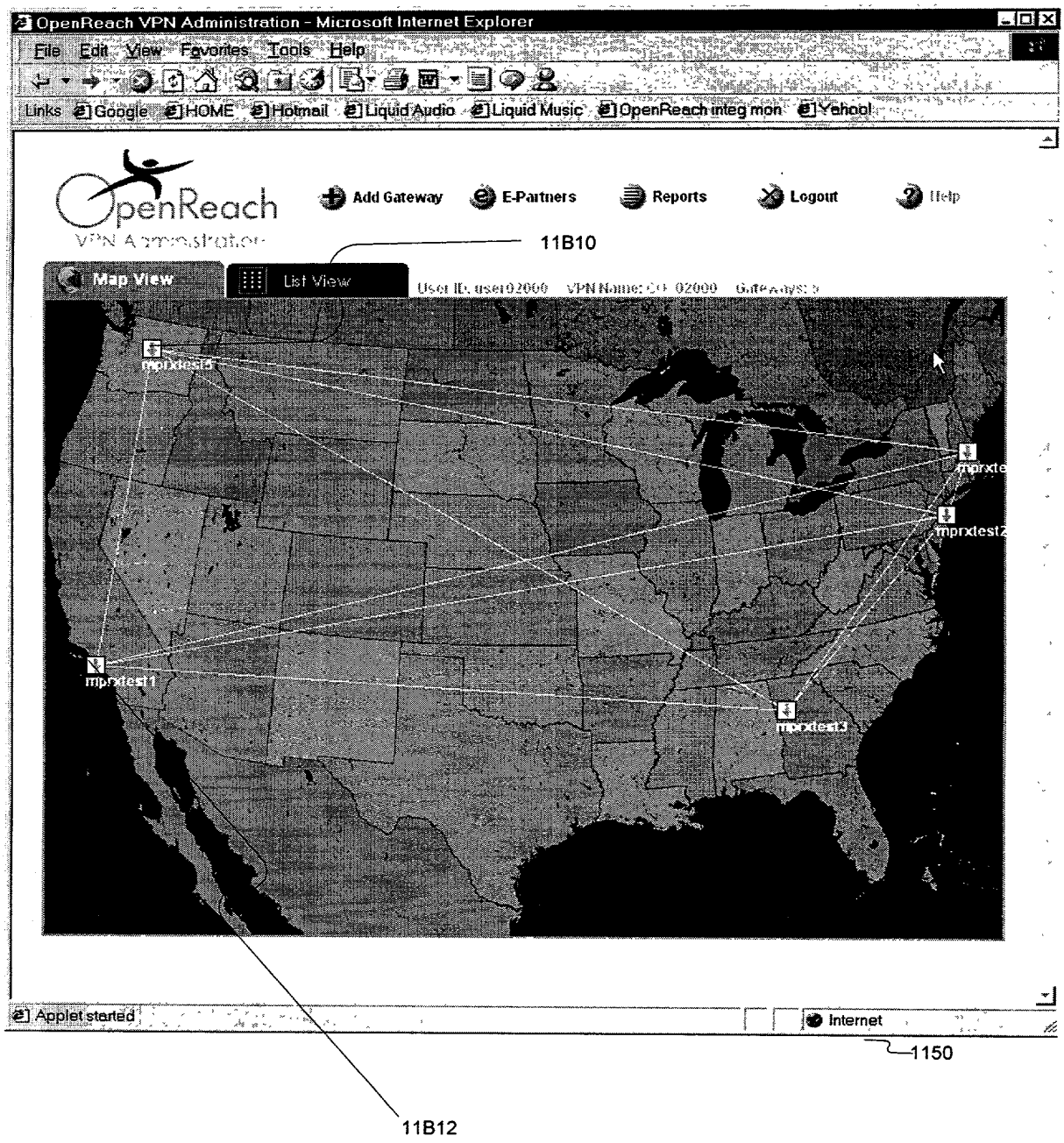

OpenReach VPN Administration - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Links Google HOME Hotmail Liquid Audio Liquid Music OpenReach integ mon Yahoo!
OpenReach
VPN Administration
Add Gateway
E-Partners
Reports
Logout
Help
11B10
Map View
List View
mprxtest3
mprxtest1
mprxtest2
Applet started
Internet
1150
11B12

FIG. 11B

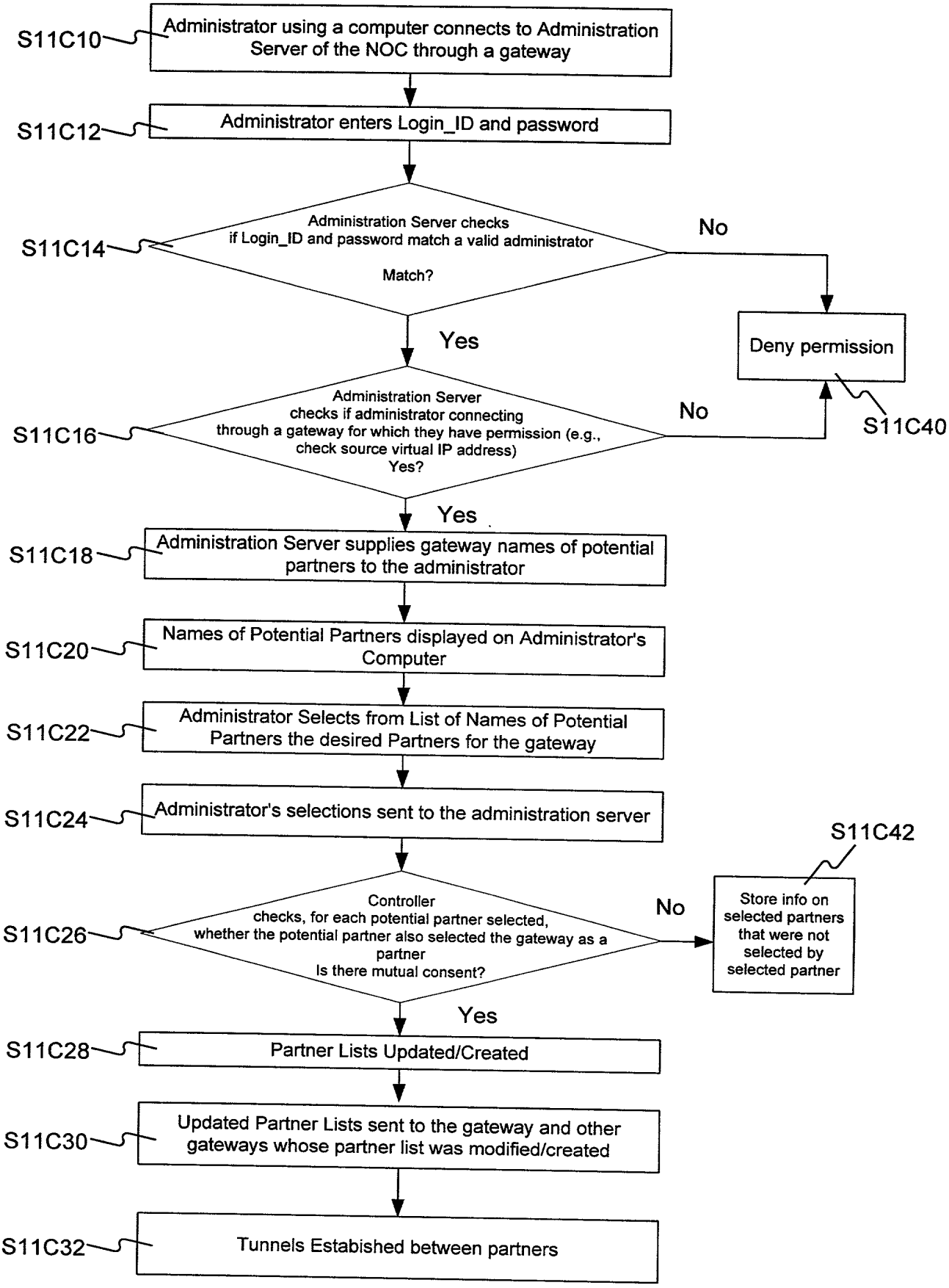

S11C10
Administrator using a computer connects to Administration Server of the NOC through a gateway
S11C12
Administrator enters Login_ID and password
S11C14
Administration Server checks if Login_ID and password match a valid administrator
Match?
No
Yes
Deny permission
S11C40
S11C16
Administration Server checks if administrator connecting through a gateway for which they have permission (e.g., check source virtual IP address)
Yes?
No
Yes
S11C18
Administration Server supplies gateway names of potential partners to the administrator
S11C20
Names of Potential Partners displayed on Administrator's Computer
S11C22
Administrator Selects from List of Names of Potential Partners the desired Partners for the gateway
S11C24
Administrator's selections sent to the administration server
S11C42
S11C26
Controller checks, for each potential partner selected, whether the potential partner also selected the gateway as a partner
Is there mutual consent?
No
Store info on selected partners that were not selected by selected partner
Yes
S11C28
Partner Lists Updated/Created
S11C30
Updated Partner Lists sent to the gateway and other gateways whose partner list was modified/created
S11C32
Tunnels Estabished between partners

Fig. 11C

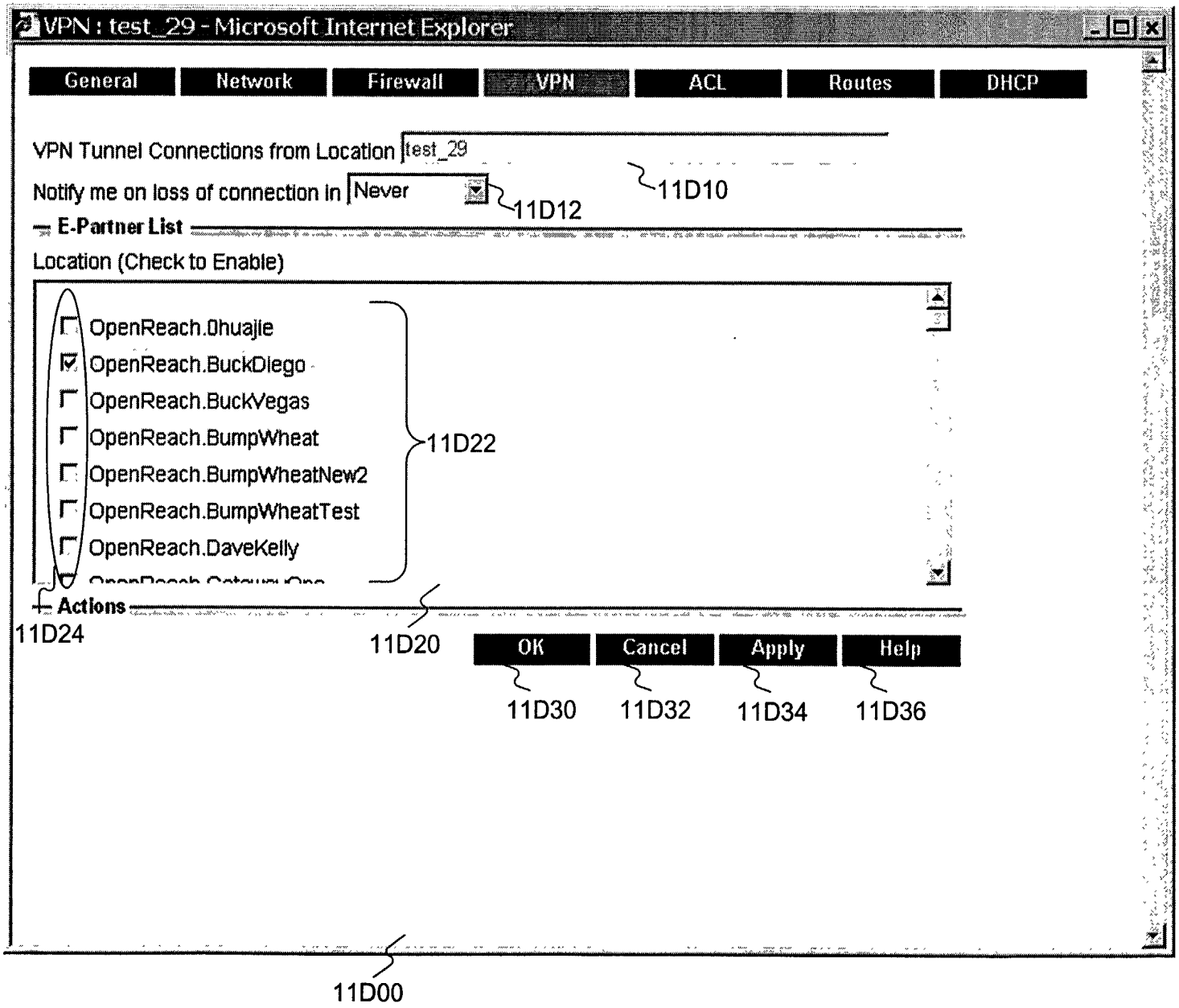

VPN : test_29 - Microsoft Internet Explorer
General
Network
Firewall
VPN
ACL
Routes
DHCP
VPN Tunnel Connections from Location
test_29
Notify me on loss of connection in
Never
11D10
11D12
E-Partner List
Location (Check to Enable)
OpenReach.0huajie
OpenReach.BuckDiego
OpenReach.BuckVegas
OpenReach.BumpWheat
OpenReach.BumpWheatNew2
OpenReach.BumpWheatTest
OpenReach.DaveKelly
11D22
Actions
11D24
11D20
OK
Cancel
Apply
Help
11D30
11D32
11D34
11D36
11D00

Fig. 11D

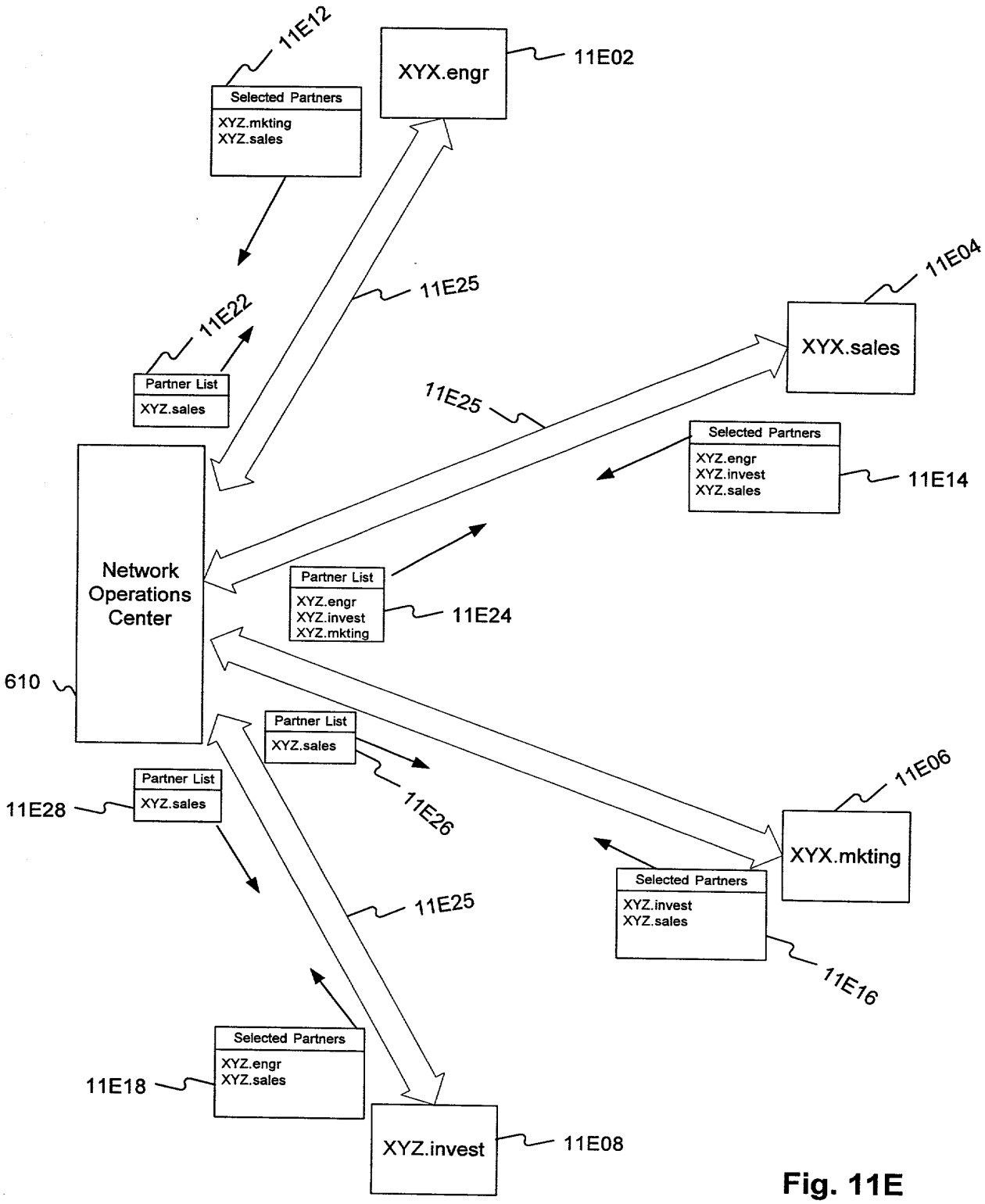

11E12
Selected Partners
XYZ.mkting
XYZ.sales
XYX.engr
11E02
11E25
11E22
Partner List
XYZ.sales
11E04
XYX.sales
11E25
Selected Partners
XYZ.engr
XYZ.invest
XYZ.sales
11E14
Network Operations Center
610
Partner List
XYZ.engr
XYZ.invest
XYZ.mkting
11E24
Partner List
XYZ.sales
11E26
11E28
Partner List
XYZ.sales
11E06
XYX.mkting
Selected Partners
XYZ.invest
XYZ.sales
11E16
11E25
Selected Partners
XYZ.engr
XYZ.sales
11E18
XYZ.invest
11E08

Fig. 11E

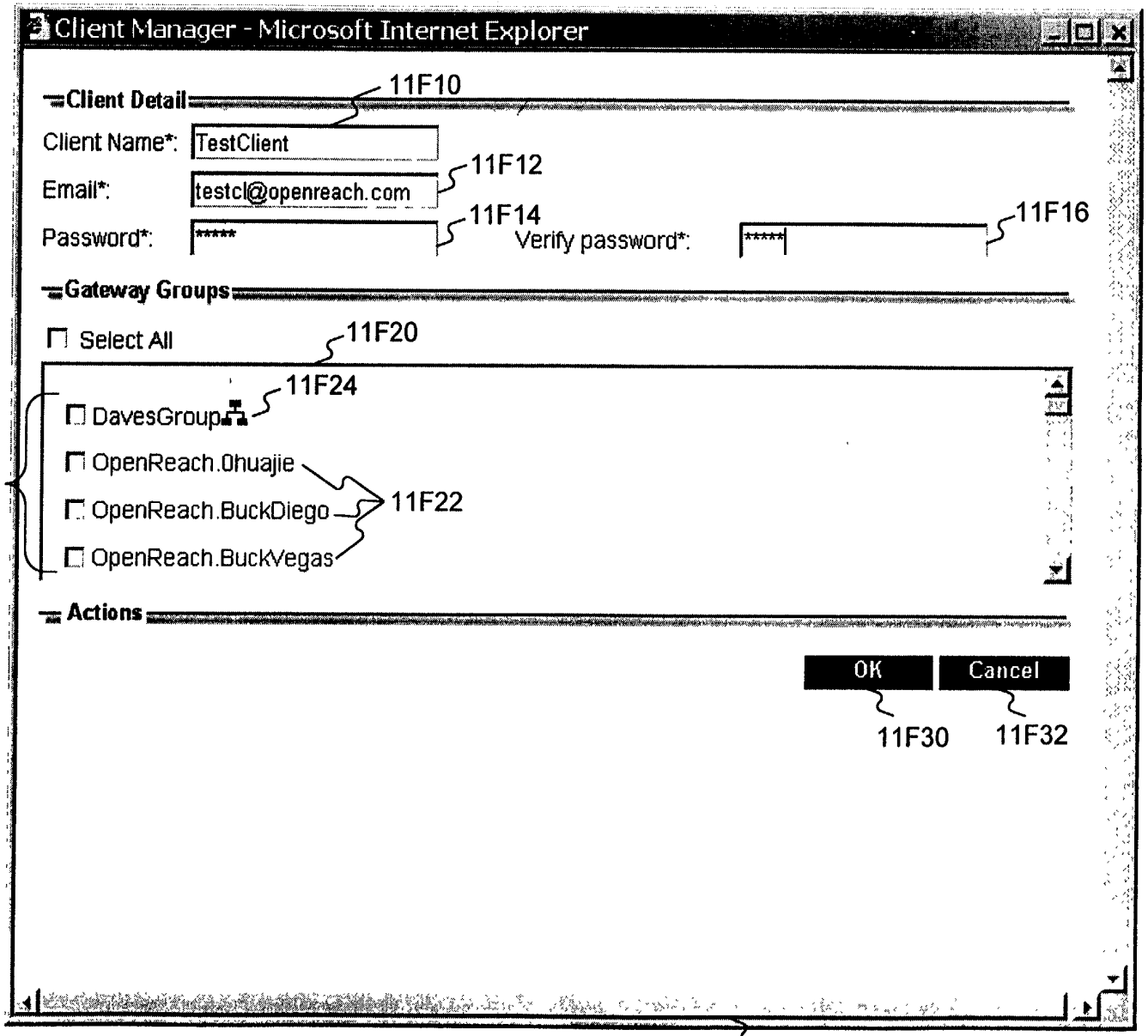

Client Manager - Microsoft Internet Explorer
Client Detail
11F10
Client Name*:
TestClient
Email*:
testcl@openreach.com
11F12
Password*:
*****
11F14
Verify password*:
*****
11F16
Gateway Groups
Select All
11F20
11F24
DavesGroup
OpenReach.Ohuajie
OpenReach.BuckDiego
OpenReach.BuckVegas
11F22
11F26
Actions
OK
Cancel
11F30
11F32
11F00

Fig. 11F

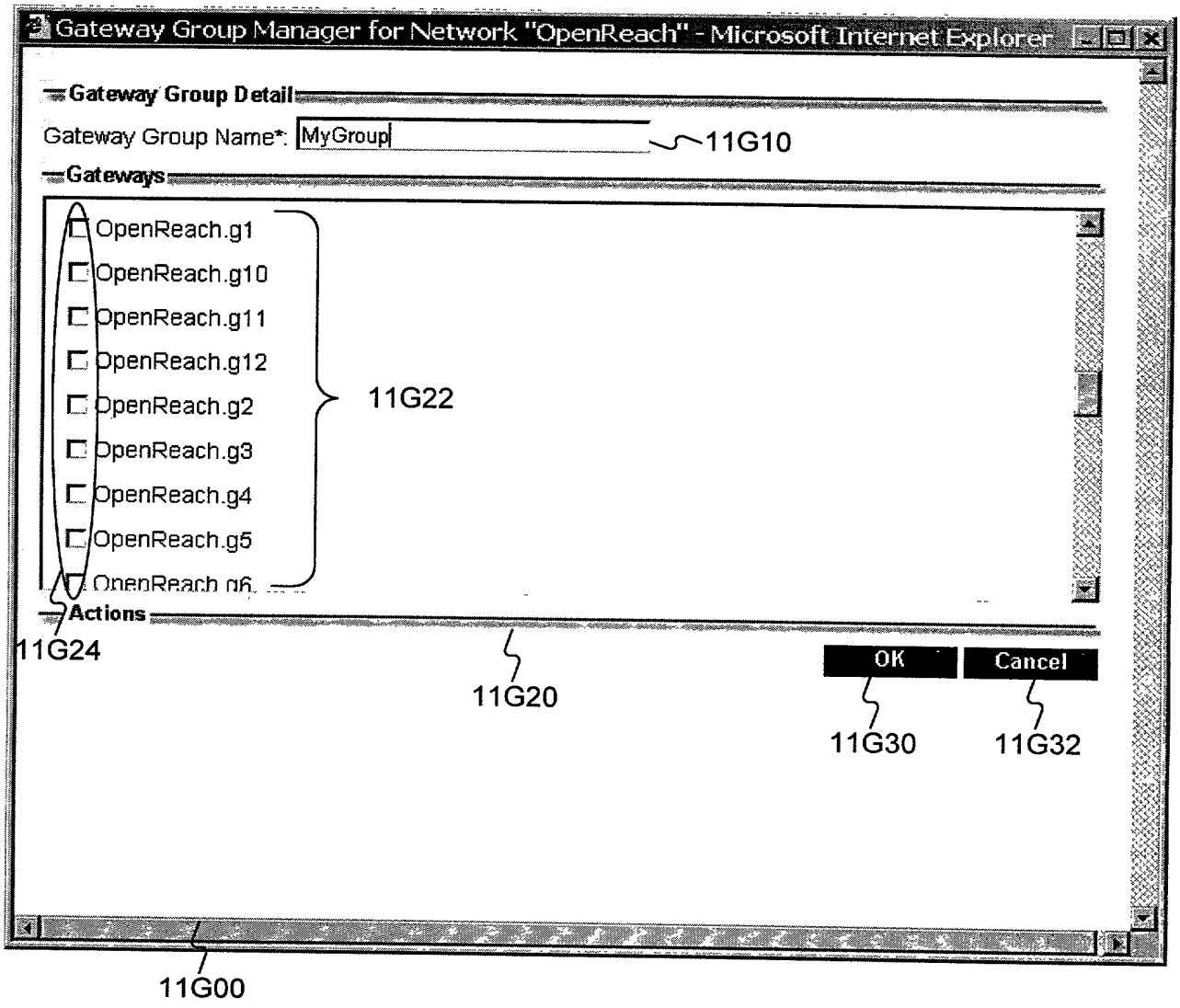

Gateway Group Manager for Network "OpenReach" - Microsoft Internet Explorer
Gateway Group Detail
Gateway Group Name*: MyGroup
11G10
Gateways
OpenReach.g1
OpenReach.g10
OpenReach.g11
OpenReach.g12
OpenReach.g2
OpenReach.g3
OpenReach.g4
OpenReach.g5
OpenReach.g6
11G22
Actions
11G24
11G20
OK
Cancel
11G30
11G32
11G00

Fig. 11G

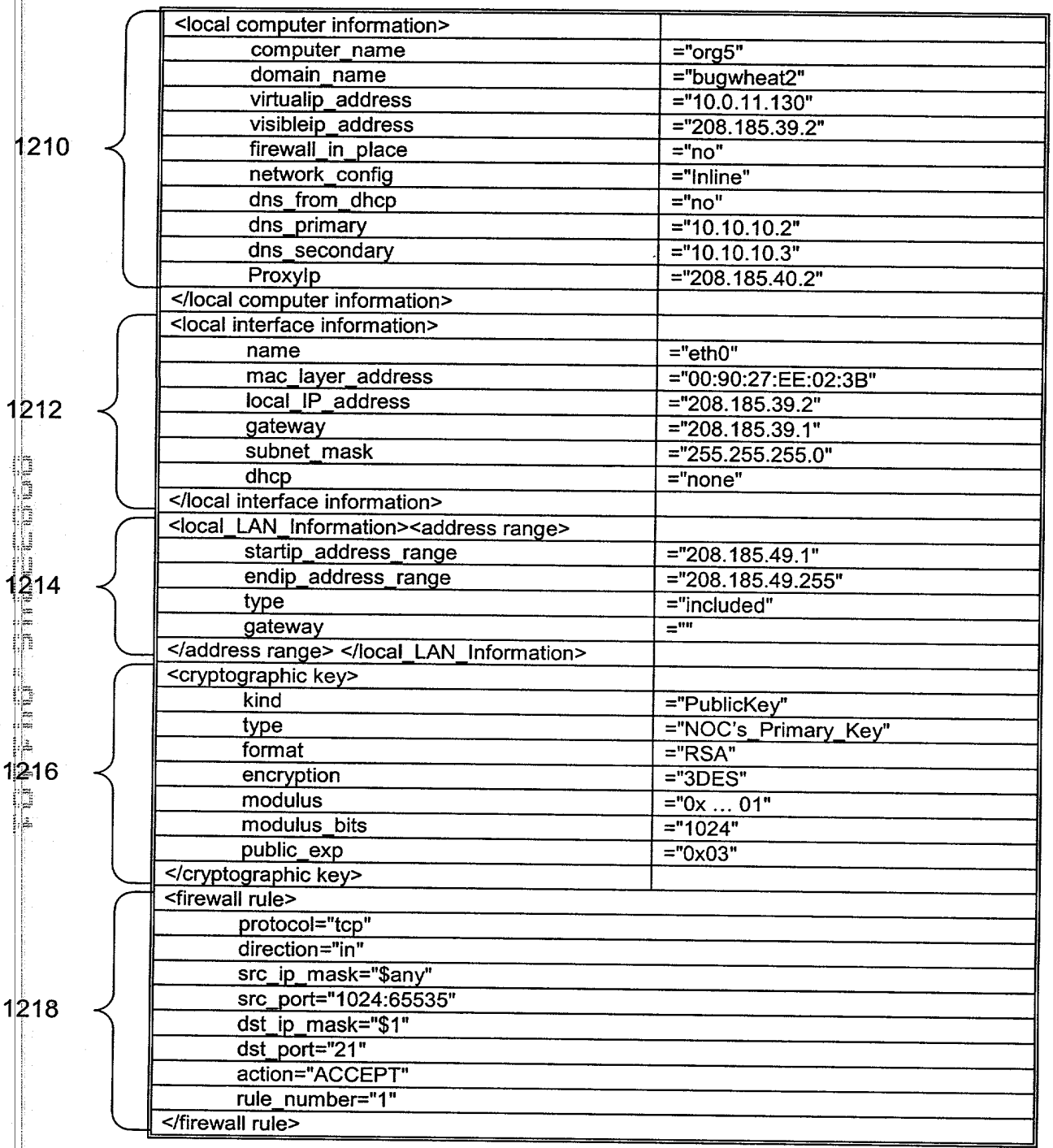

<local computer information>
computer_name ="org5"
domain_name ="bugwheat2"
virtualip_address ="10.0.11.130"
visibleip_address ="208.185.39.2"
firewall_in_place ="no"
network_config ="Inline"
dns_from_dhcp ="no"
dns_primary ="10.10.10.2"
dns_secondary ="10.10.10.3"
ProxyIp ="208.185.40.2"
</local computer information>
<local interface information>
name ="eth0"
mac_layer_address ="00:90:27:EE:02:3B"
local_IP_address ="208.185.39.2"
gateway ="208.185.39.1"
subnet_mask ="255.255.255.0"
dhcp ="none"
</local interface information>
<local_LAN_Information><address range>
startip_address_range ="208.185.49.1"
endip_address_range ="208.185.49.255"
type ="included"
gateway =""
</address range> </local_LAN_Information>
<cryptographic key>
kind ="PublicKey"
type ="NOC's_Primary_Key"
format ="RSA"
encryption ="3DES"
modulus ="0x ... 01"
modulus_bits ="1024"
public_exp ="0x03"
</cryptographic key>
<firewall rule>
protocol="tcp"
direction="in"
src_ip_mask="$any"
src_port="1024:65535"
dst_ip_mask="$1"
dst_port="21"
action="ACCEPT"
rule_number="1"
</firewall rule>
1210
1212
1214
1216
1218

Fig. 12

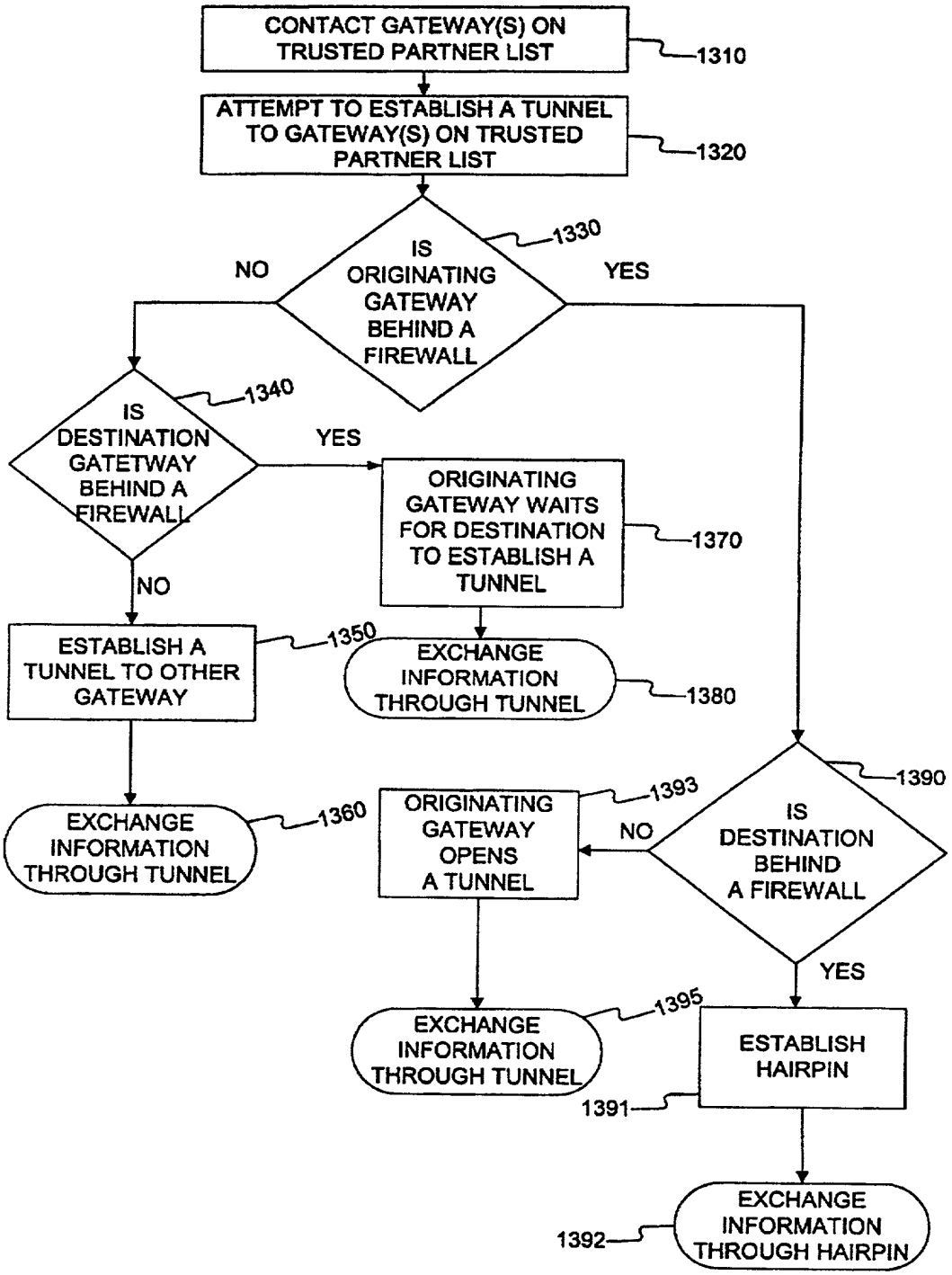

CONTACT GATEWAY(S) ON TRUSTED PARTNER LIST
1310
ATTEMPT TO ESTABLISH A TUNNEL TO GATEWAY(S) ON TRUSTED PARTNER LIST
1320
IS ORIGINATING GATEWAY BEHIND A FIREWALL
1330
NO
YES
IS DESTINATION GATETWAY BEHIND A FIREWALL
1340
YES
NO
ORIGINATING GATEWAY WAITS FOR DESTINATION TO ESTABLISH A TUNNEL
1370
ESTABLISH A TUNNEL TO OTHER GATEWAY
1350
EXCHANGE INFORMATION THROUGH TUNNEL
1380
EXCHANGE INFORMATION THROUGH TUNNEL
1360
ORIGINATING GATEWAY OPENS A TUNNEL
1393
NO
IS DESTINATION BEHIND A FIREWALL
1390
YES
EXCHANGE INFORMATION THROUGH TUNNEL
1395
ESTABLISH HAIRPIN
1391
EXCHANGE INFORMATION THROUGH HAIRPIN
1392

FIG. 13

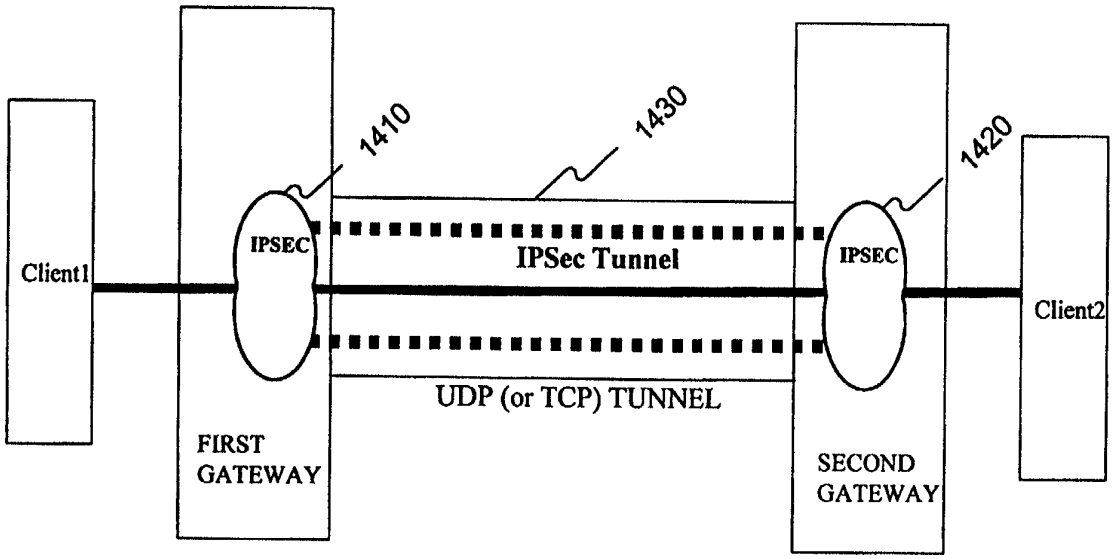

Client1
IPSEC
1410
1430
IPSec Tunnel
UDP (or TCP) TUNNEL
FIRST
GATEWAY
IPSEC
1420
SECOND
GATEWAY
Client2

FIG. 14

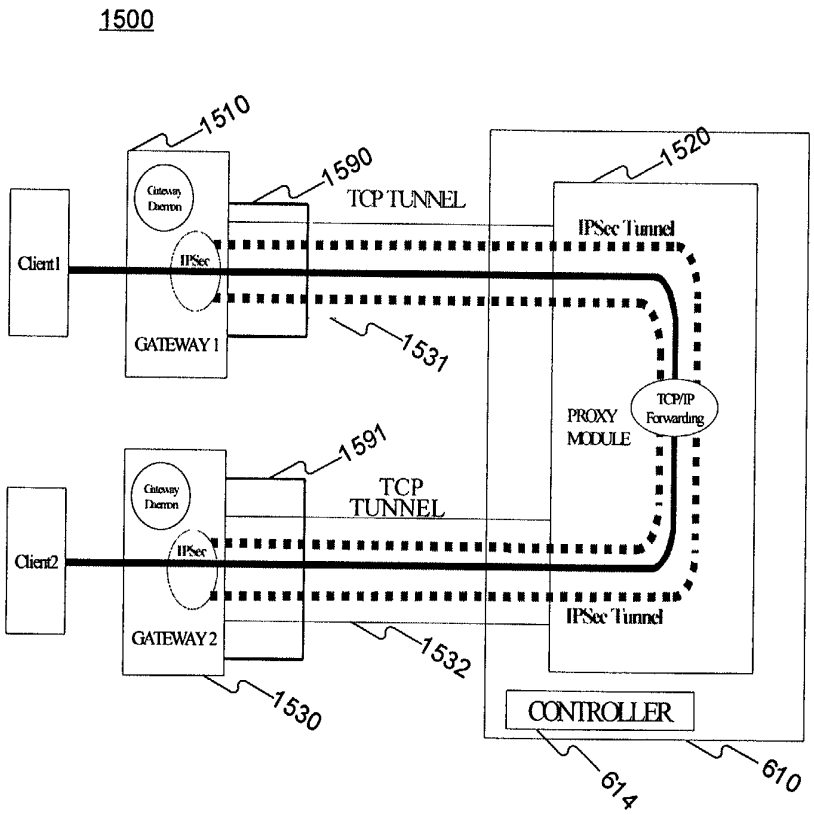

1500
1510
1590
1520
TCP TUNNEL
IPSec Tunnel
Client1
Gateway Daemon
IPSec
GATEWAY 1
1531
PROXY MODULE
TCP/IP Forwarding
1591
TCP TUNNEL
Client2
Gateway Daemon
IPSec
IPSec Tunnel
GATEWAY 2
1532
1530
CONTROLLER
614
610

FIG. 15A

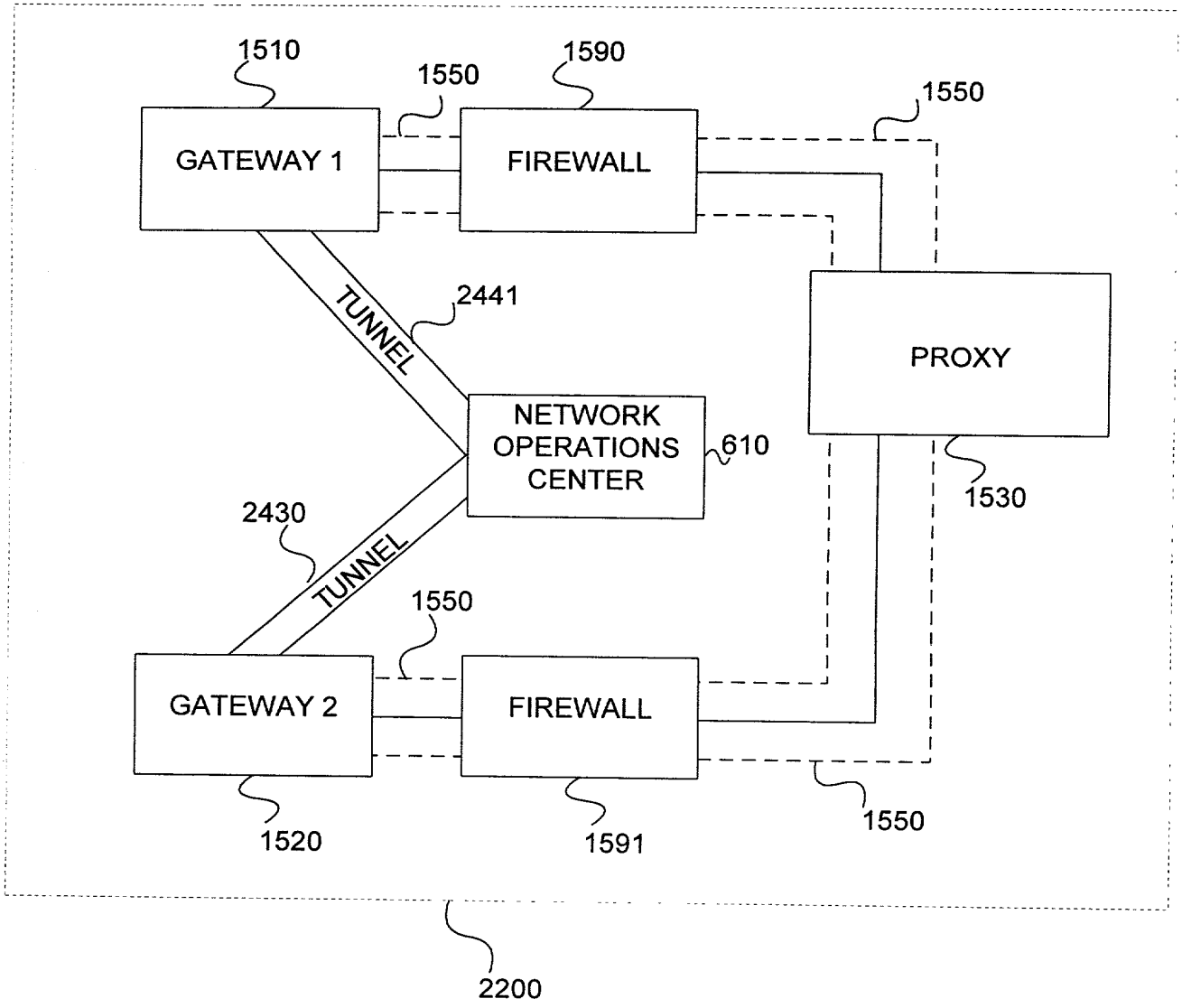

1510
1550
1590
1550
GATEWAY 1
FIREWALL
2441
TUNNEL
PROXY
NETWORK
OPERATIONS
CENTER
610
1530
2430
TUNNEL
1550
GATEWAY 2
FIREWALL
1520
1591
1550
2200

FIG. 15B

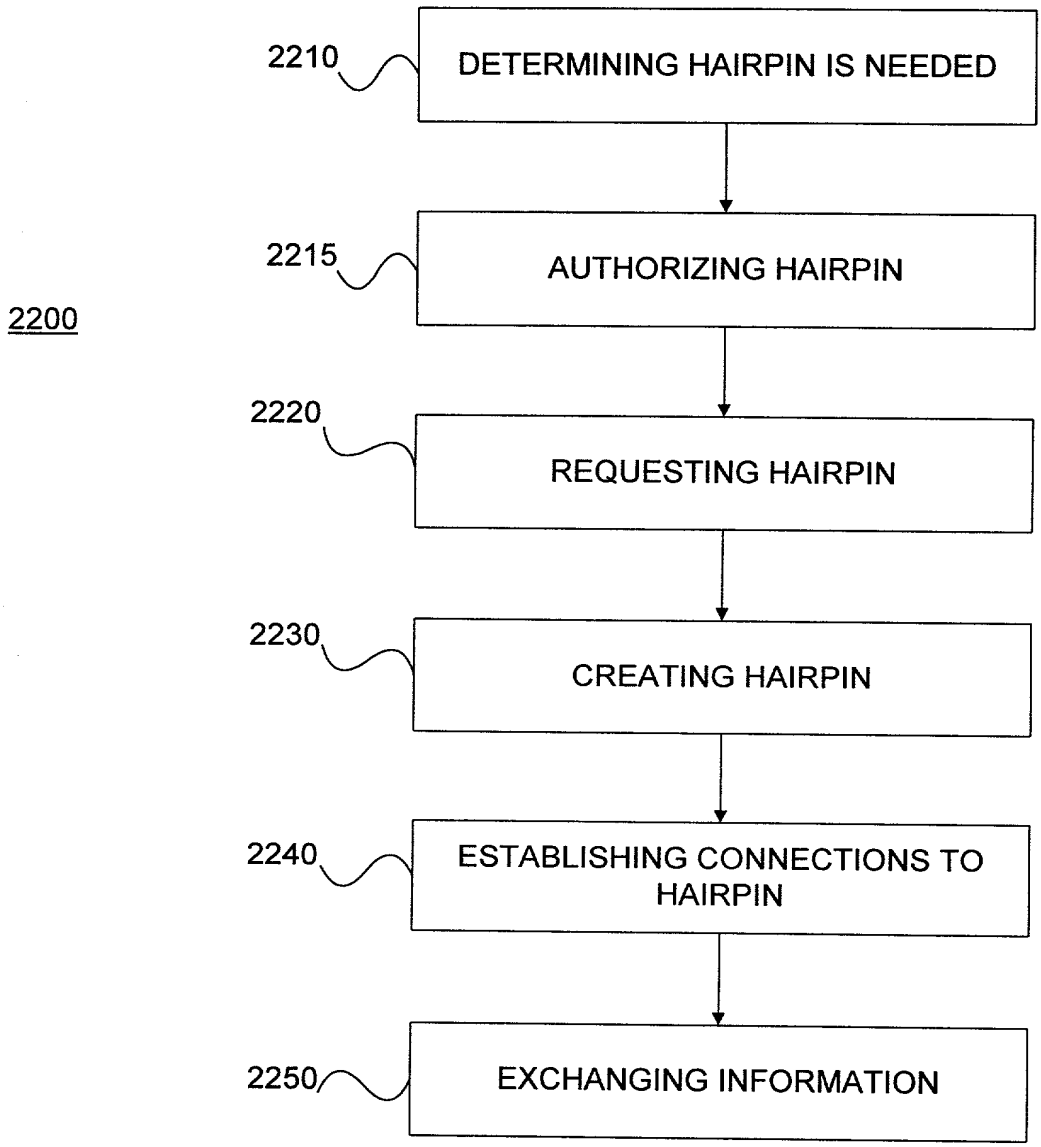

2200
2210
DETERMINING HAIRPIN IS NEEDED
2215
AUTHORIZING HAIRPIN
2220
REQUESTING HAIRPIN
2230
CREATING HAIRPIN
2240
ESTABLISHING CONNECTIONS TO HAIRPIN
2250
EXCHANGING INFORMATION

FIG. 15C

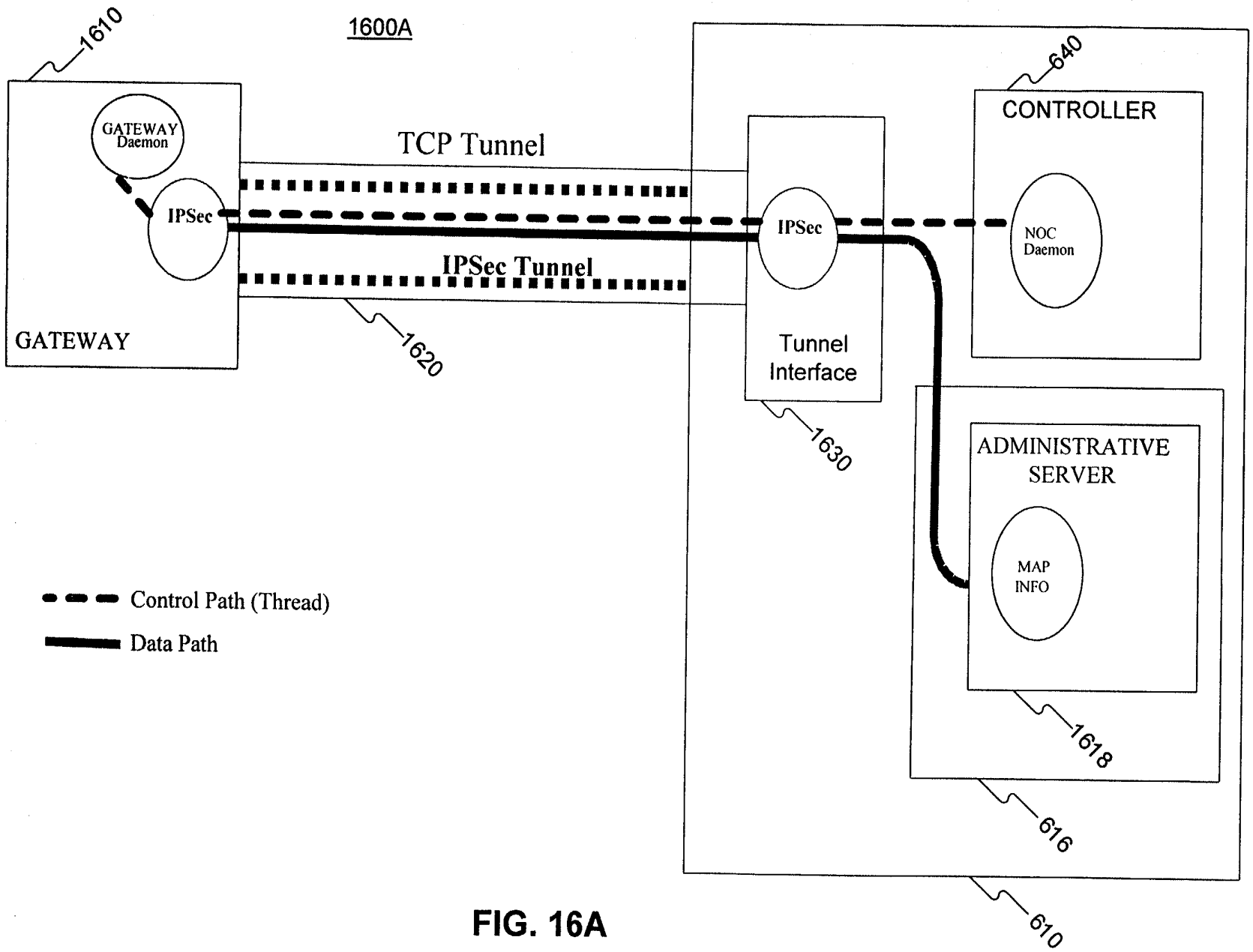

1600A
1610
GATEWAY Daemon
IPSec
GATEWAY
TCP Tunnel
IPSec Tunnel
1620
IPSec
Tunnel Interface
1630
640
CONTROLLER
NOC Daemon
ADMINISTRATIVE SERVER
MAP INFO
1618
616
610
Control Path (Thread)
Data Path

FIG. 16A

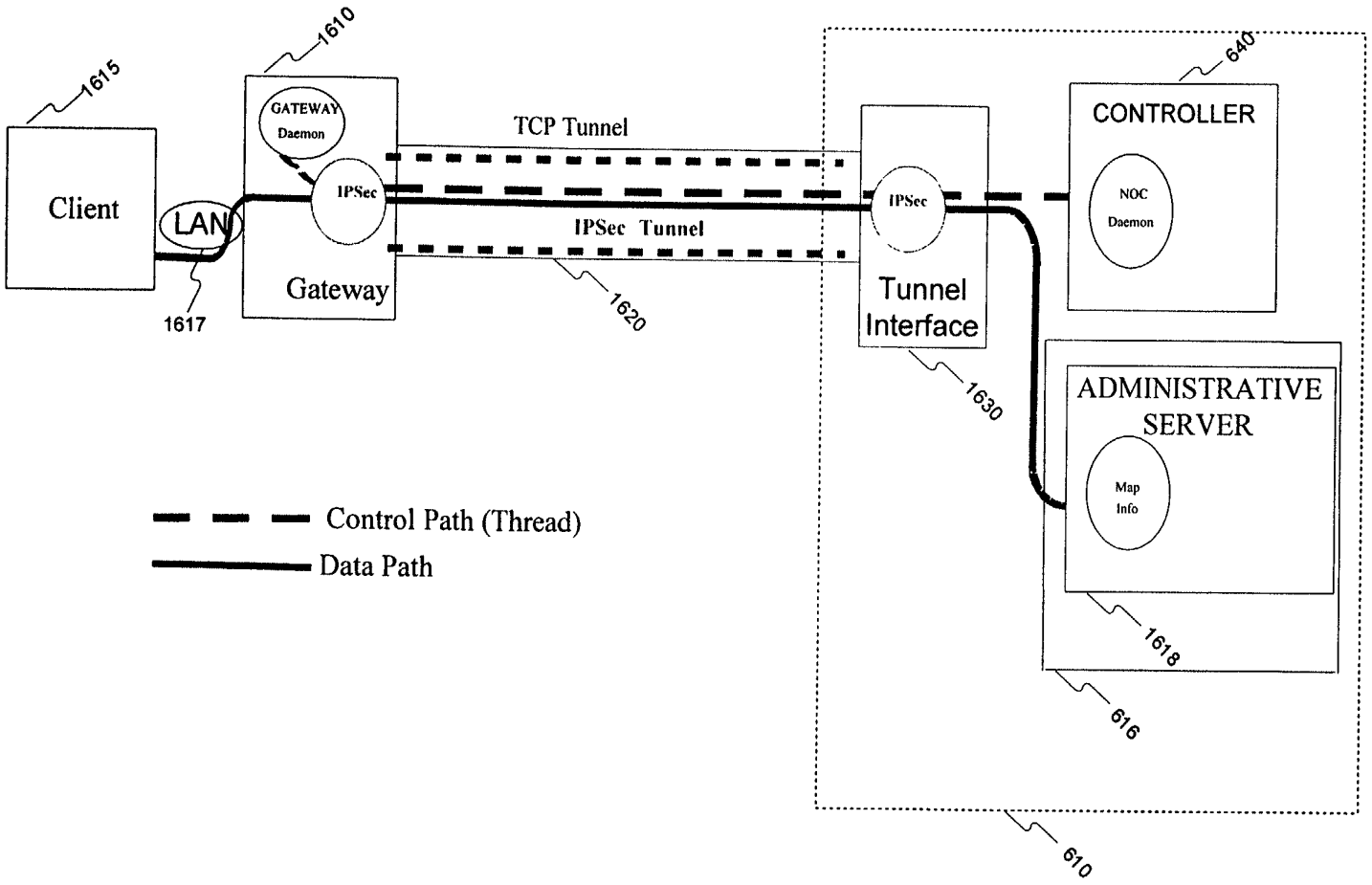

1600B
1615
1610
640
GATEWAY
Daemon
TCP Tunnel
CONTROLLER
Client
LAN
IPSec
IPSec
NOC
Daemon
IPSec Tunnel
Gateway
Tunnel
Interface
1617
1620
1630
ADMINISTRATIVE
SERVER
Map
Info
Control Path (Thread)
Data Path
1618
616
610

FIG. 16B

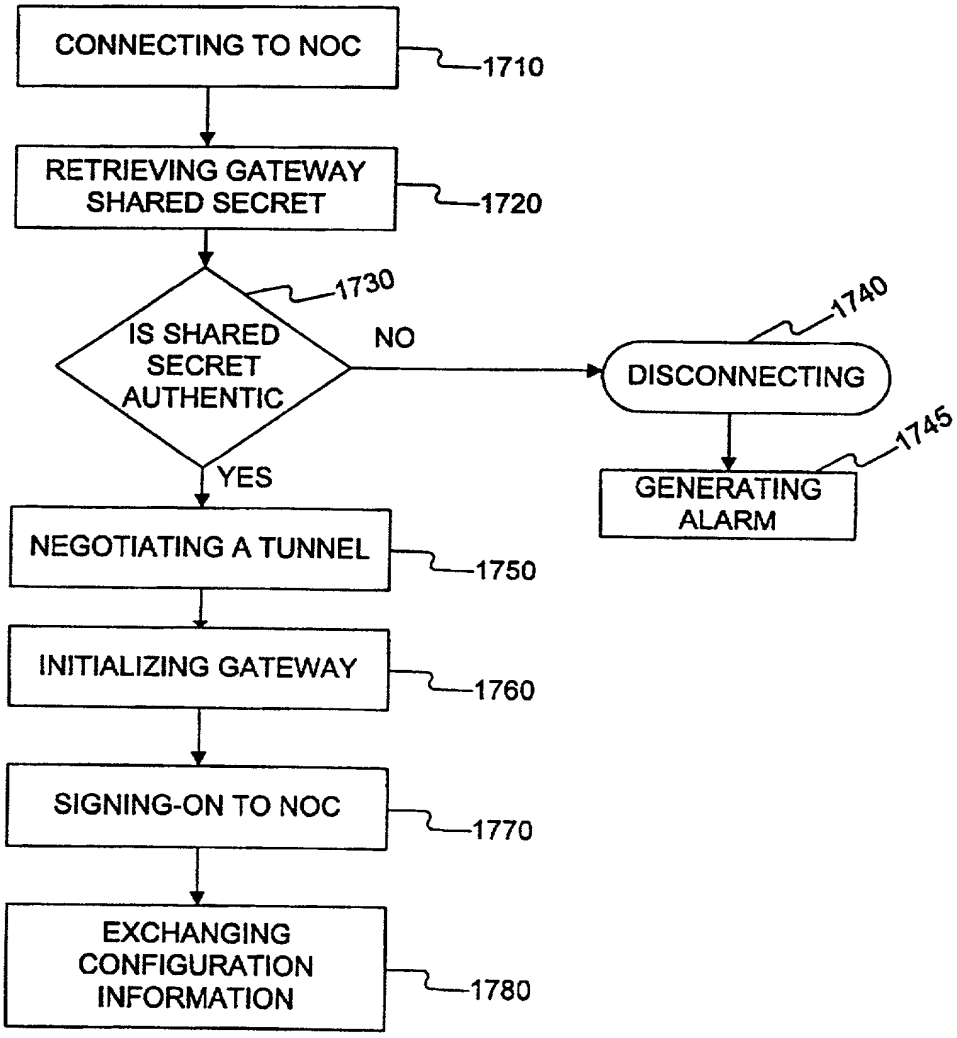

CONNECTING TO NOC
1710
RETRIEVING GATEWAY SHARED SECRET
1720
1730
IS SHARED SECRET AUTHENTIC
NO
1740
DISCONNECTING
1745
GENERATING ALARM
YES
NEGOTIATING A TUNNEL
1750
INITIALIZING GATEWAY
1760
SIGNING-ON TO NOC
1770
EXCHANGING CONFIGURATION INFORMATION
1780

FIG. 17

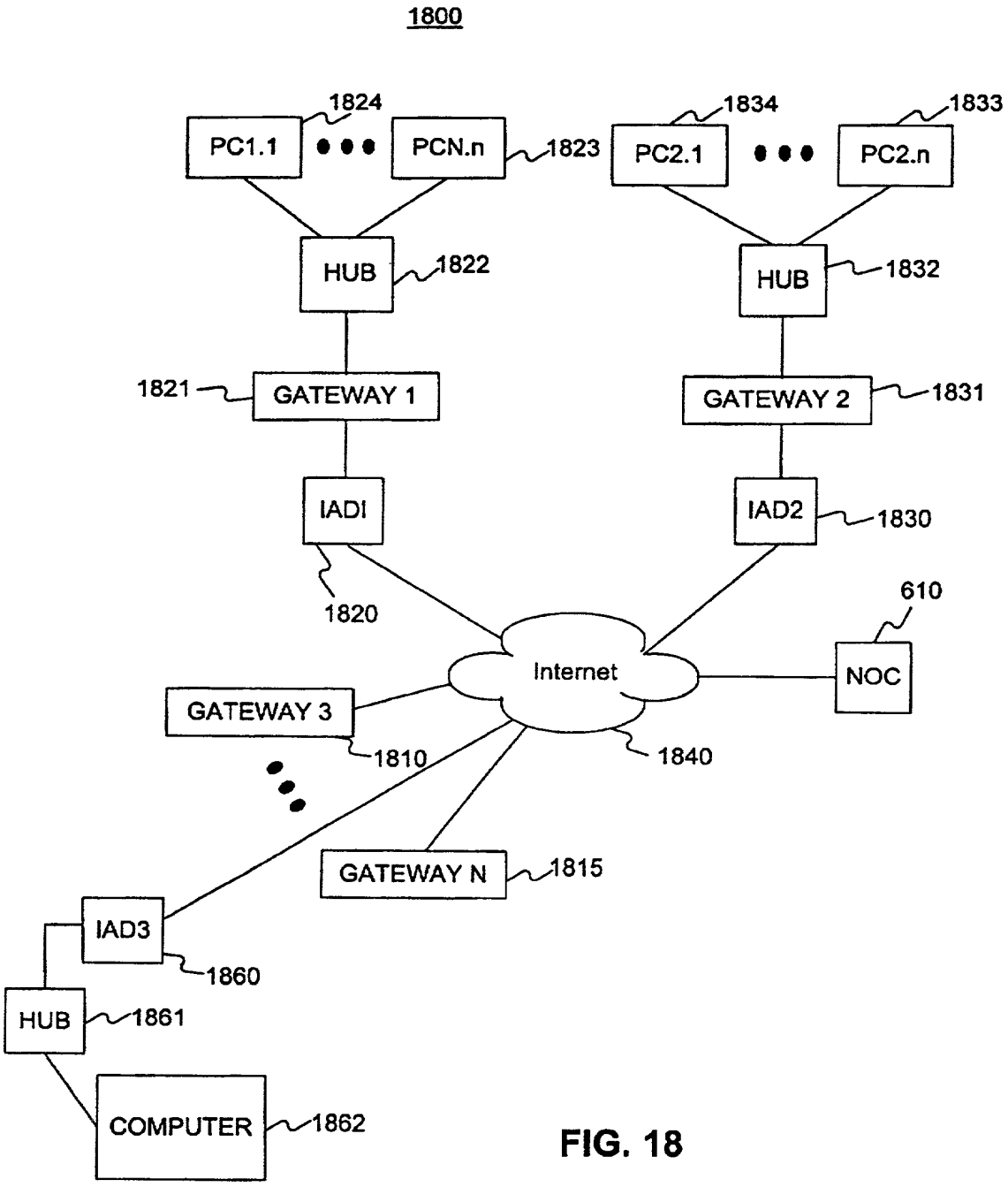

1800
1824
PC1.1
PCN.n
1823
1834
PC2.1
PC2.n
1833
HUB
1822
HUB
1832
1821
GATEWAY 1
GATEWAY 2
1831
IADI
IAD2
1830
1820
610
Internet
NOC
GATEWAY 3
1810
1840
GATEWAY N
1815
IAD3
1860
HUB
1861
COMPUTER
1862

FIG. 18

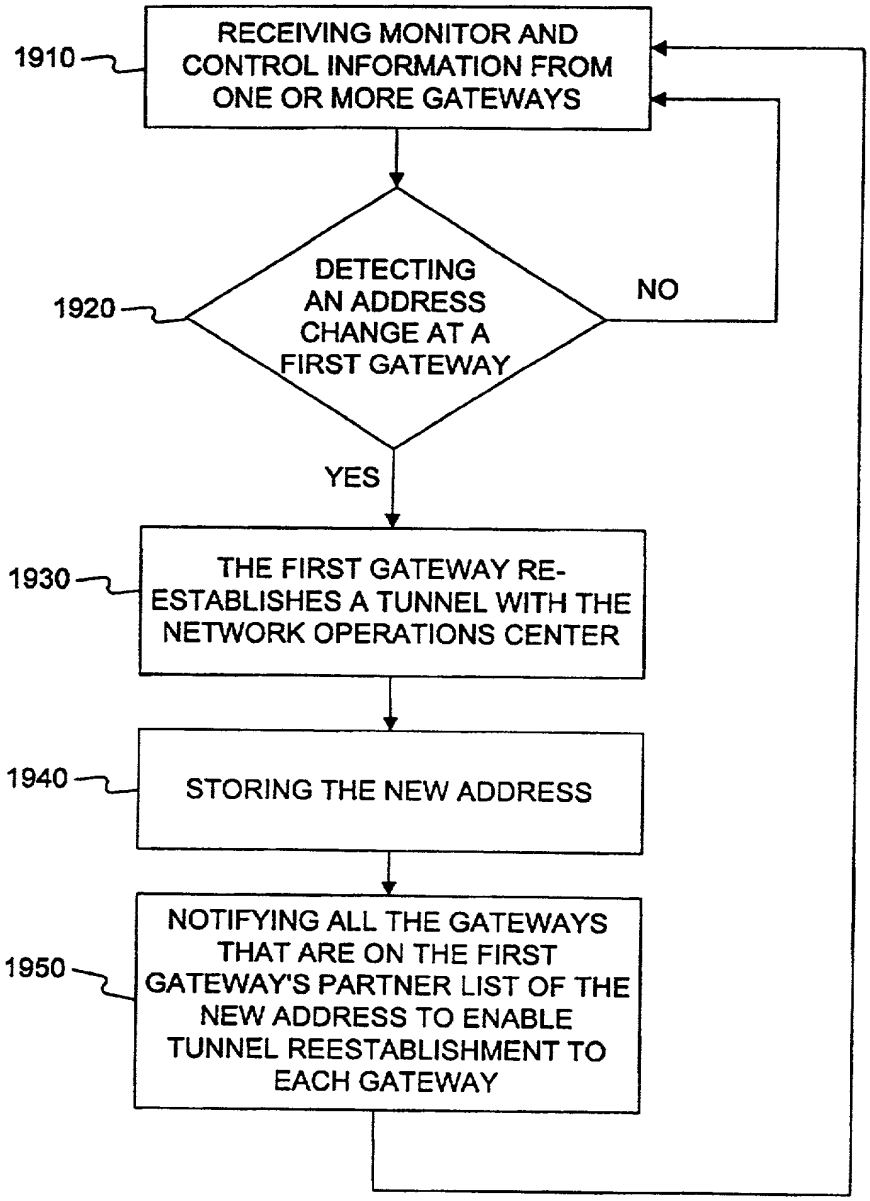

1910
RECEIVING MONITOR AND CONTROL INFORMATION FROM ONE OR MORE GATEWAYS
1920
DETECTING AN ADDRESS CHANGE AT A FIRST GATEWAY
NO
YES
1930
THE FIRST GATEWAY RE-ESTABLISHES A TUNNEL WITH THE NETWORK OPERATIONS CENTER
1940
STORING THE NEW ADDRESS
1950
NOTIFYING ALL THE GATEWAYS THAT ARE ON THE FIRST GATEWAY'S PARTNER LIST OF THE NEW ADDRESS TO ENABLE TUNNEL REESTABLISHMENT TO EACH GATEWAY

FIG. 19

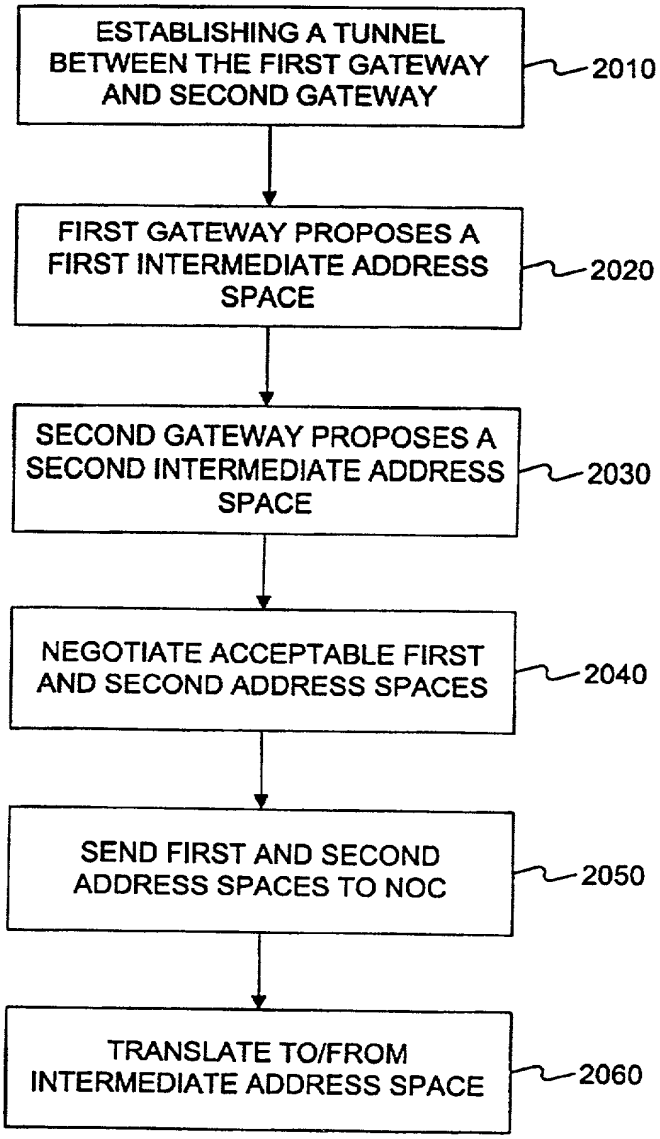

ESTABLISHING A TUNNEL BETWEEN THE FIRST GATEWAY AND SECOND GATEWAY
2010
FIRST GATEWAY PROPOSES A FIRST INTERMEDIATE ADDRESS SPACE
2020
SECOND GATEWAY PROPOSES A SECOND INTERMEDIATE ADDRESS SPACE
2030
NEGOTIATE ACCEPTABLE FIRST AND SECOND ADDRESS SPACES
2040
SEND FIRST AND SECOND ADDRESS SPACES TO NOC
2050
TRANSLATE TO/FROM INTERMEDIATE ADDRESS SPACE
2060

FIG. 20

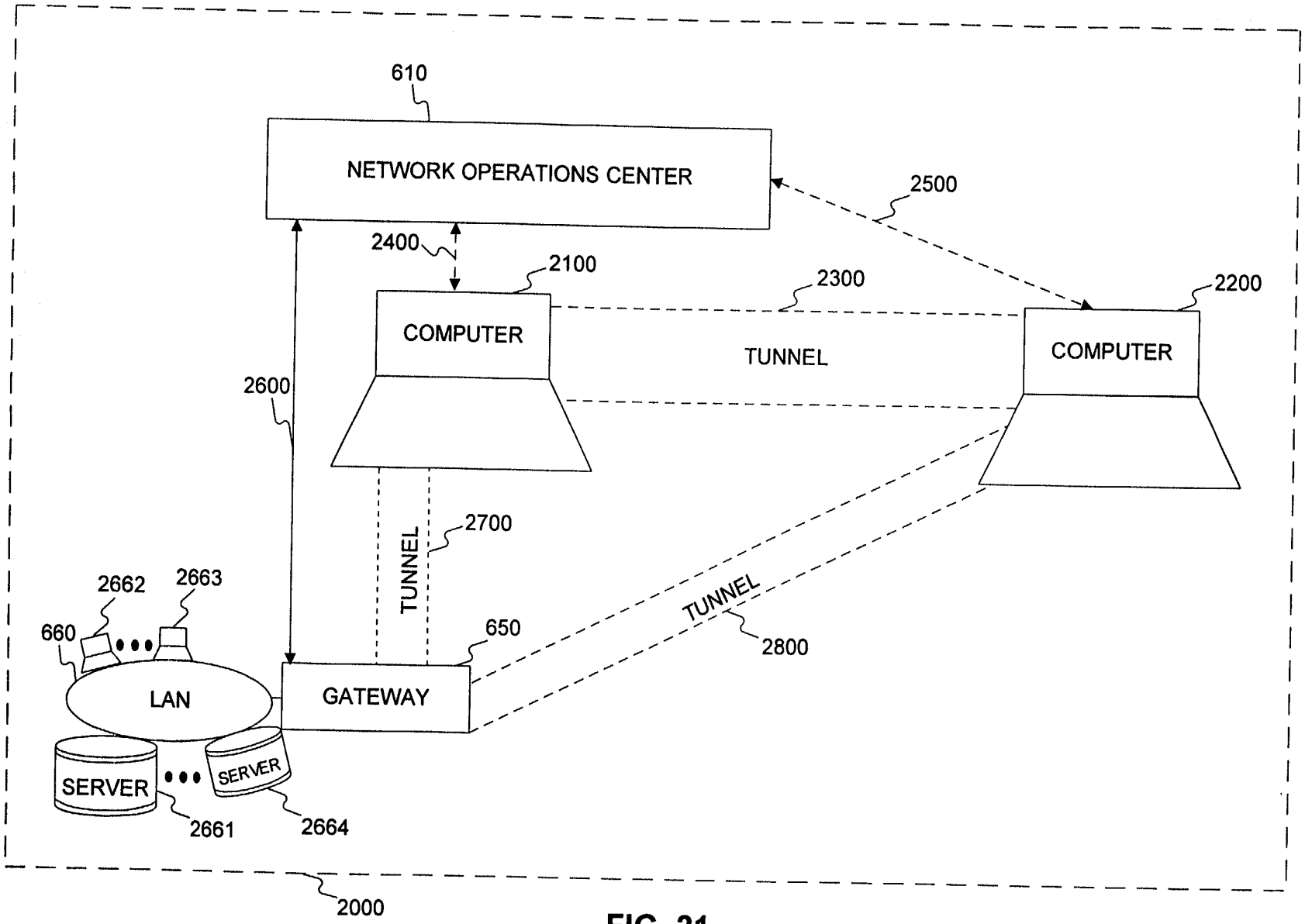

610
NETWORK OPERATIONS CENTER
2500
2400
2100
2300
2200
COMPUTER
TUNNEL
COMPUTER
2600
TUNNEL
2700
2662
2663
660
650
TUNNEL
2800
LAN
GATEWAY
SERVER
SERVER
2661
2664
2000

FIG. 21

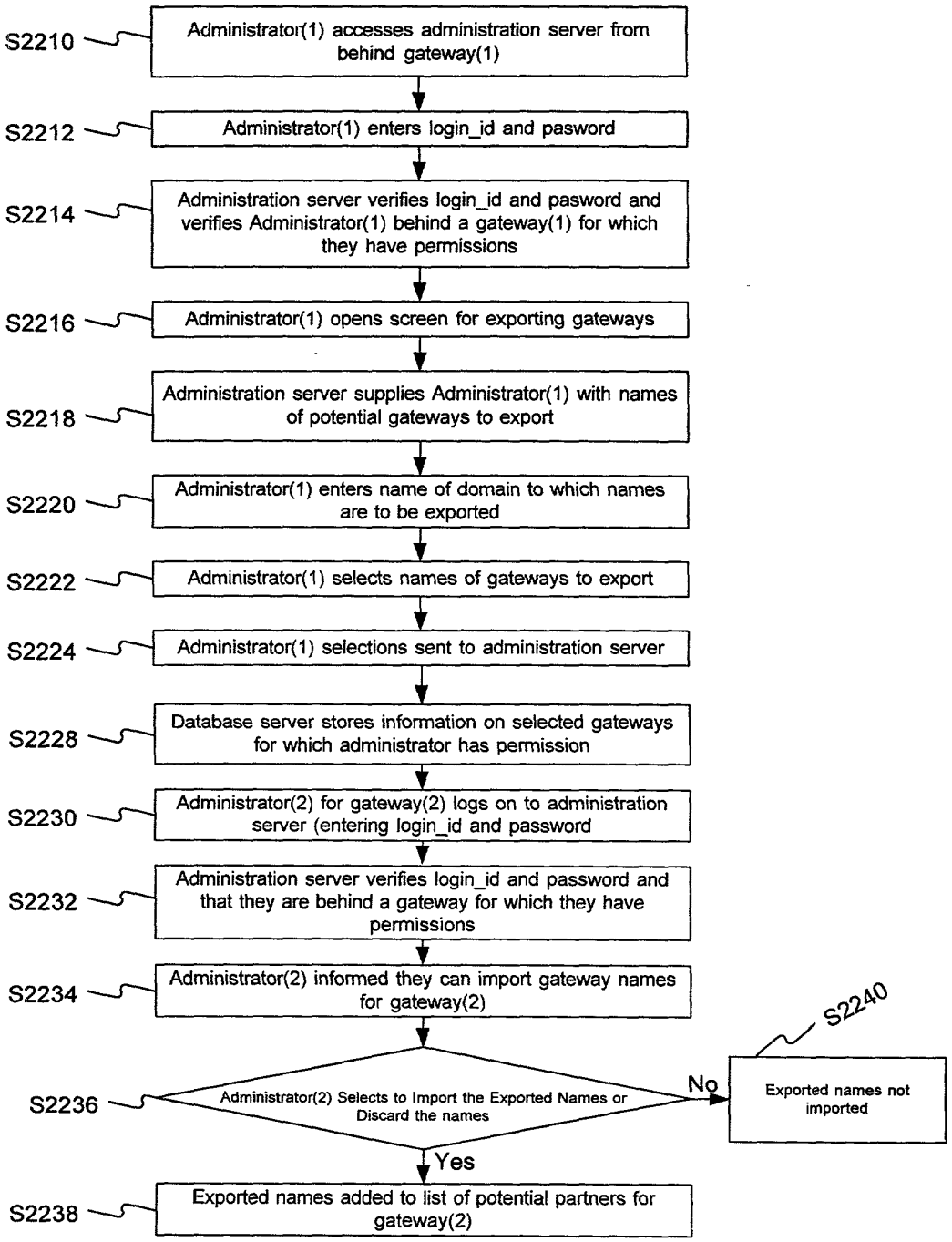

S2210
Administrator(1) accesses administration server from behind gateway(1)
S2212
Administrator(1) enters login_id and pasword
S2214
Administration server verifies login_id and pasword and verifies Administrator(1) behind a gateway(1) for which they have permissions
S2216
Administrator(1) opens screen for exporting gateways
S2218
Administration server supplies Administrator(1) with names of potential gateways to export
S2220
Administrator(1) enters name of domain to which names are to be exported
S2222
Administrator(1) selects names of gateways to export
S2224
Administrator(1) selections sent to administration server
S2228
Database server stores information on selected gateways for which administrator has permission
S2230
Administrator(2) for gateway(2) logs on to administration server (entering login_id and password
S2232
Administration server verifies login_id and password and that they are behind a gateway for which they have permissions
S2234
Administrator(2) informed they can import gateway names for gateway(2)
S2236
Administrator(2) Selects to Import the Exported Names or Discard the names
No
S2240
Exported names not imported
Yes
S2238
Exported names added to list of potential partners for gateway(2)

Fig. 22

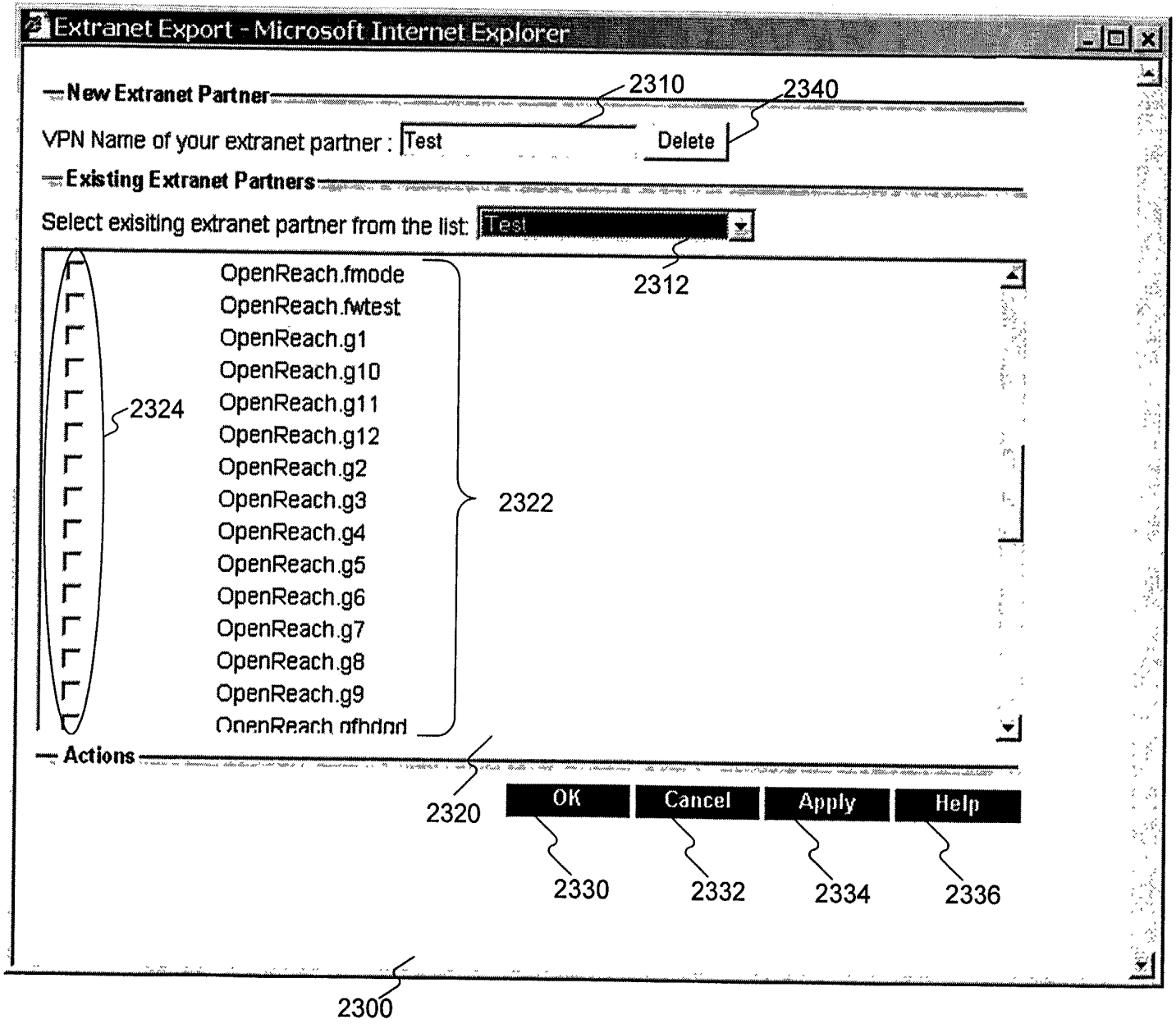

Extranet Export - Microsoft Internet Explorer
New Extranet Partner
2310
2340
VPN Name of your extranet partner :
Test
Delete
Existing Extranet Partners
Select exisiting extranet partner from the list:
Test
2312
OpenReach.fmode
OpenReach.fwtest
OpenReach.g1
OpenReach.g10
OpenReach.g11
OpenReach.g12
OpenReach.g2
OpenReach.g3
OpenReach.g4
OpenReach.g5
OpenReach.g6
OpenReach.g7
OpenReach.g8
OpenReach.g9
2324
2322
Actions
2320
OK
Cancel
Apply
Help
2330
2332
2334
2336
2300

Fig. 23

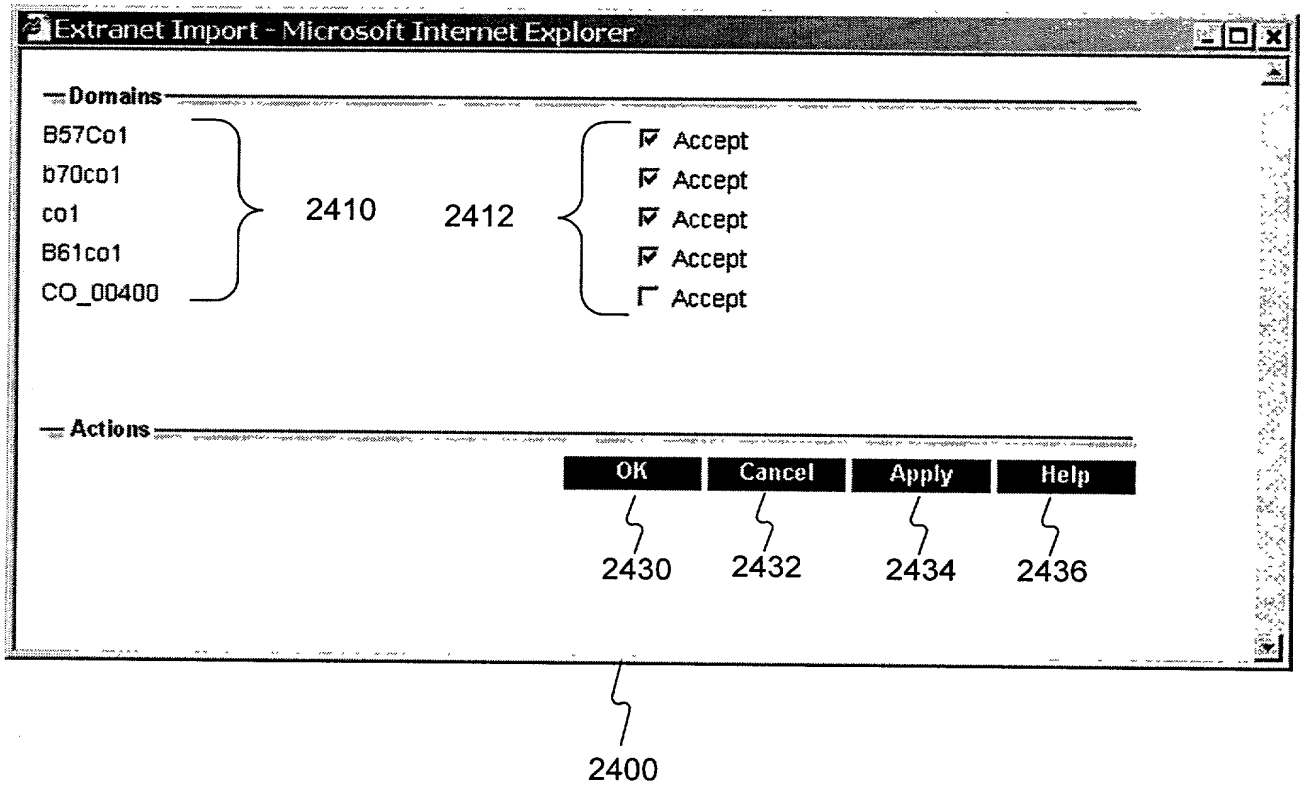

Extranet Import - Microsoft Internet Explorer
Domains
B57Co1
b70co1
co1
B61co1
CO_00400
2410
2412
Accept
Accept
Accept
Accept
Accept
Actions
OK
Cancel
Apply
Help
2430
2432
2434
2436
2400

Fig. 24

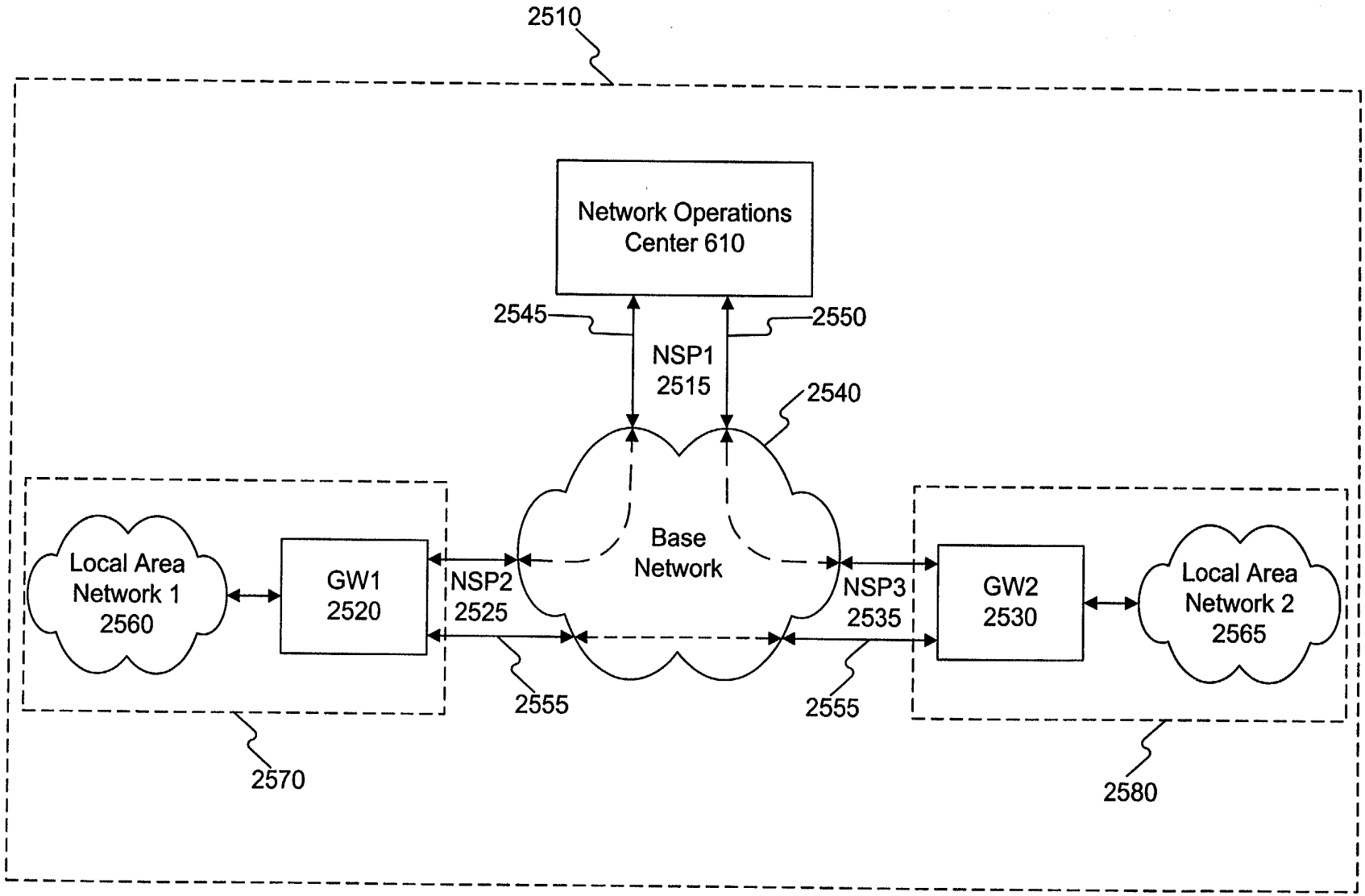

2510
Network Operations Center 610
2545
2550
NSP1
2515
2540
Base Network
Local Area Network 1
2560
GW1
2520
NSP2
2525
NSP3
2535
GW2
2530
Local Area Network 2
2565
2555
2555
2570
2580

FIG. 25

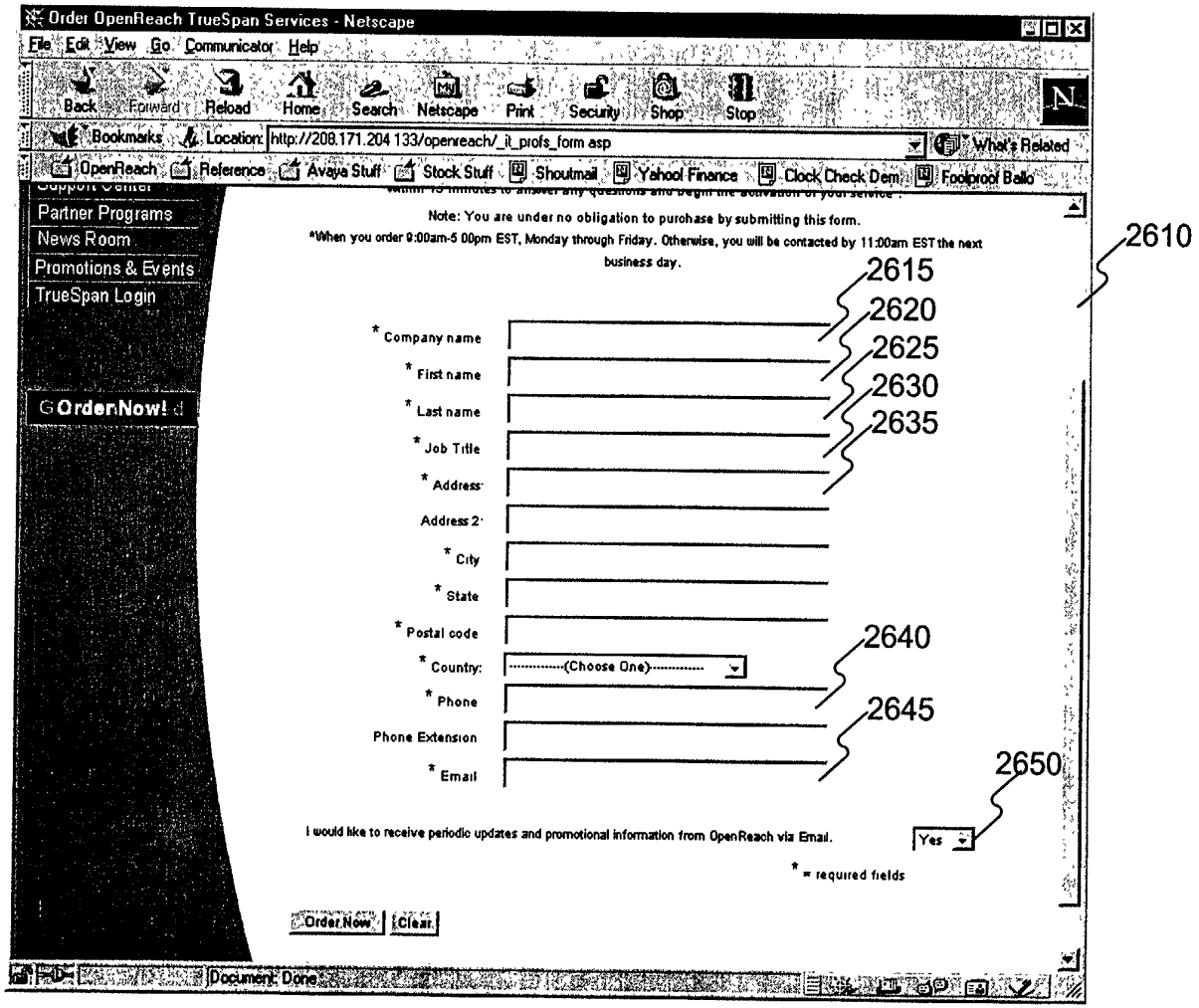

Order OpenReach TrueSpan Services - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: http://208.171.204.133/openreach/_it_profs_form.asp
What's Related
OpenReach Reference Avaya Stuff Stock Stuff Shoutmail Yahoo! Finance Clock Check Dem Foolproof Ballo
Partner Programs
News Room
Promotions & Events
TrueSpan Login
OrderNow!
Note: You are under no obligation to purchase by submitting this form.
*When you order 9:00am-5:00pm EST, Monday through Friday. Otherwise, you will be contacted by 11:00am EST the next business day.
* Company name
* First name
* Last name
* Job Title
* Address
Address 2
* City
* State
* Postal code
* Country: ----------(Choose One)----------
* Phone
Phone Extension
* Email
I would like to receive periodic updates and promotional information from OpenReach via Email.
Yes
* = required fields
Order Now
Clear
Document: Done
2610
2615
2620
2625
2630
2635
2640
2645
2650

FIG. 26

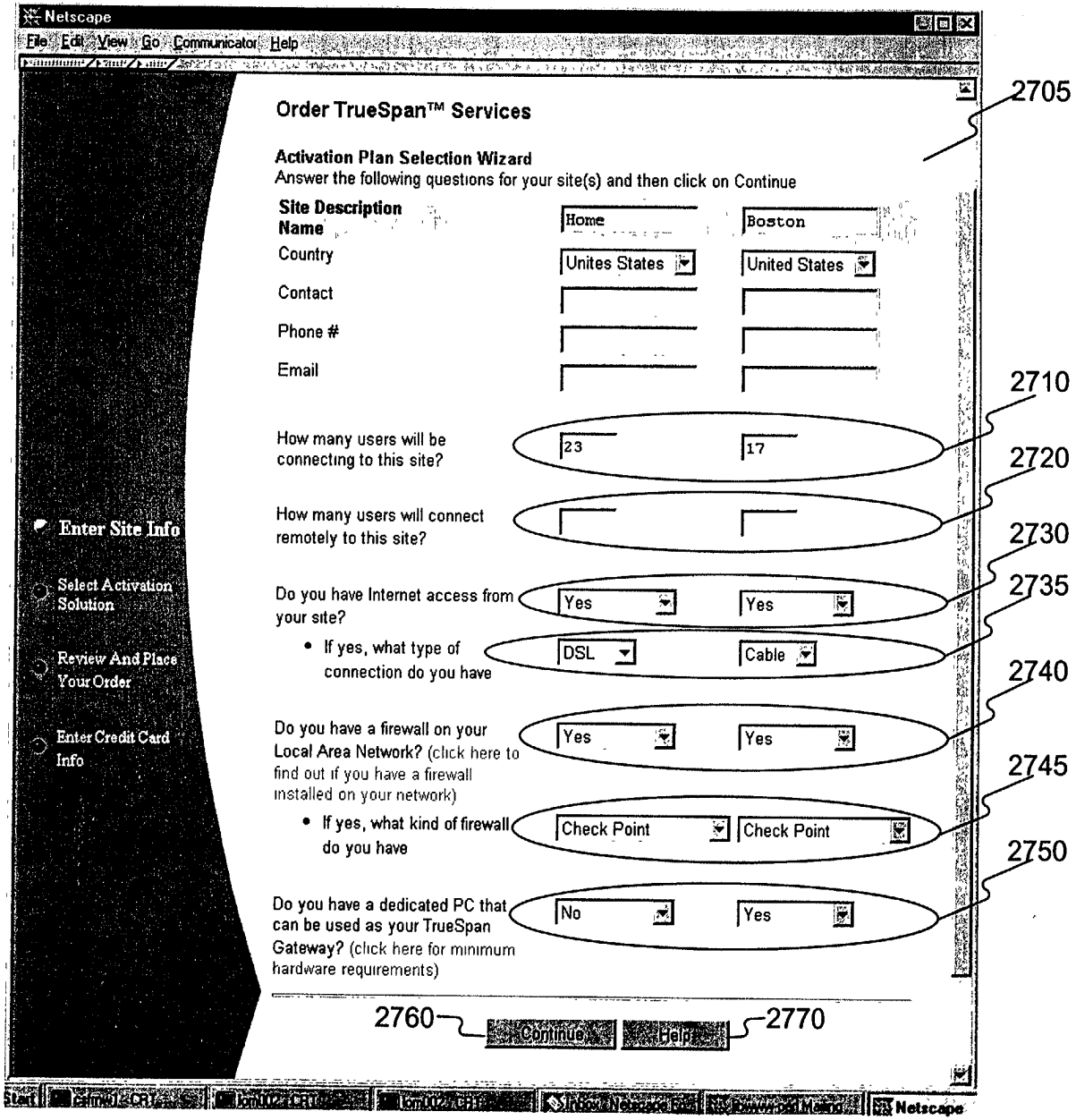

Netscape
File Edit View Go Communicator Help
Order TrueSpan™ Services
Activation Plan Selection Wizard
Answer the following questions for your site(s) and then click on Continue
Site Description Name
Home
Boston
Country
Unites States
United States
Contact
Phone #
Email
How many users will be connecting to this site?
23
17
How many users will connect remotely to this site?
Do you have Internet access from your site?
Yes
Yes
If yes, what type of connection do you have
DSL
Cable
Do you have a firewall on your Local Area Network? (click here to find out if you have a firewall installed on your network)
Yes
Yes
If yes, what kind of firewall do you have
Check Point
Check Point
Do you have a dedicated PC that can be used as your TrueSpan Gateway? (click here for minimum hardware requirements)
No
Yes
Enter Site Info
Select Activation Solution
Review And Place Your Order
Enter Credit Card Info
Continue
Help
2705
2710
2720
2730
2735
2740
2745
2750
2760
2770

FIG. 27

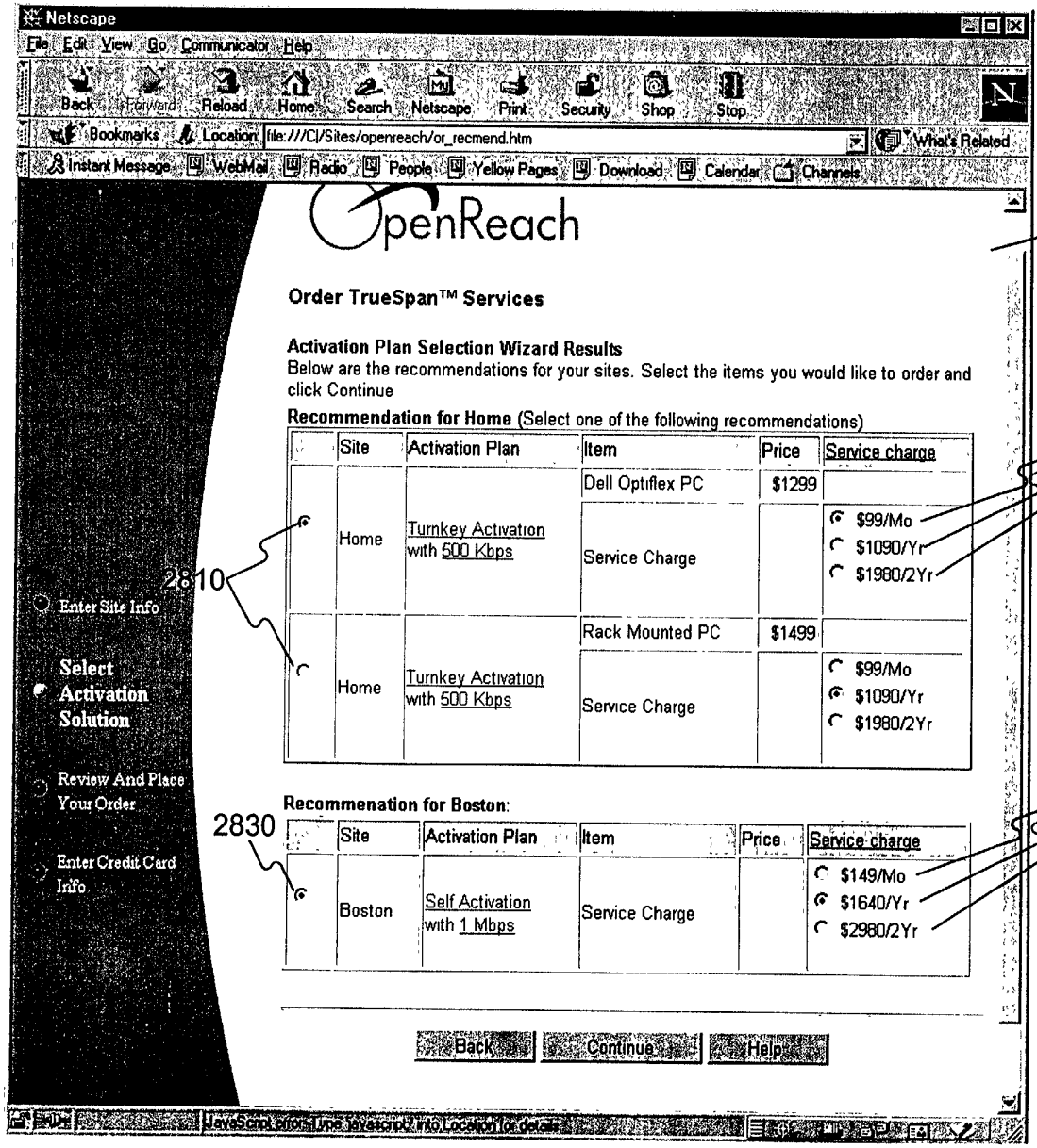

Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: file:///C|/Sites/openreach/or_recmend.htm
What's Related
Instant Message WebMail Radio People Yellow Pages Download Calendar Channels
OpenReach
2805
Order TrueSpan™ Services
Activation Plan Selection Wizard Results
Below are the recommendations for your sites. Select the items you would like to order and click Continue
Recommendation for Home (Select one of the following recommendations)
2820
2810
Site | Activation Plan | Item | Price | Service charge
Home | Turnkey Activation with 500 Kbps | Dell Optiflex PC | $1299 |
Service Charge | $99/Mo $1090/Yr $1980/2Yr
Home | Turnkey Activation with 500 Kbps | Rack Mounted PC | $1499 |
Service Charge | $99/Mo $1090/Yr $1980/2Yr
Enter Site Info
Select Activation Solution
Review And Place Your Order
Enter Credit Card Info
Recommenation for Boston:
2830
2840
Site | Activation Plan | Item | Price | Service charge
Boston | Self Activation with 1 Mbps | Service Charge | | $149/Mo $1640/Yr $2980/2Yr
Back
Continue
Help
JavaScript error: line javascript:, into Location for details

FIG. 28

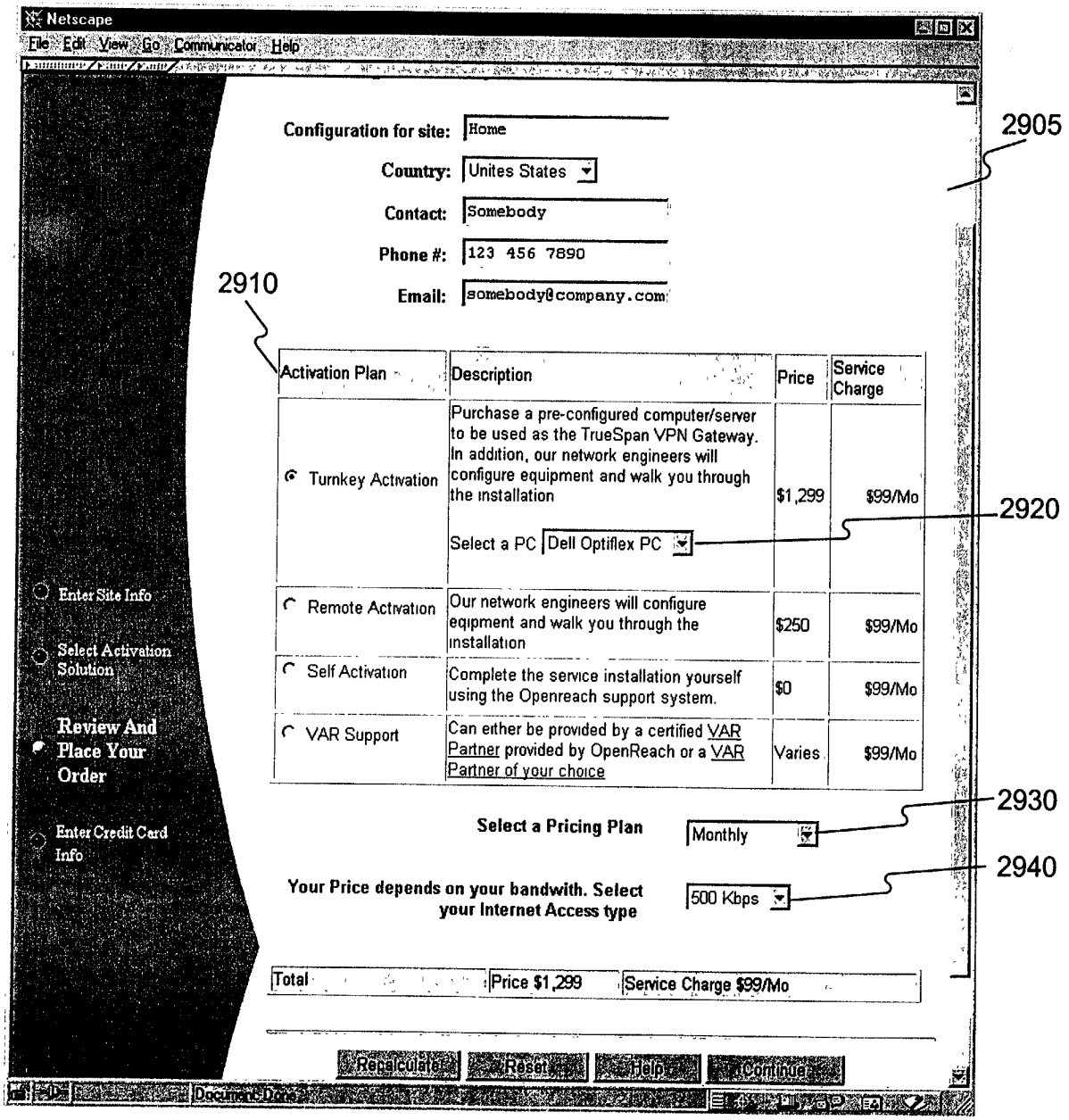

Netscape
File Edit View Go Communicator Help
Configuration for site: Home
Country: Unites States
Contact: Somebody
Phone #: 123 456 7890
Email: somebody@company.com
2905
2910
Activation Plan
Description
Price
Service Charge
Turnkey Activation
Purchase a pre-configured computer/server to be used as the TrueSpan VPN Gateway. In addition, our network engineers will configure equipment and walk you through the installation
$1,299
$99/Mo
Select a PC Dell Optiflex PC
2920
Remote Activation
Our network engineers will configure equipment and walk you through the installation
$250
$99/Mo
Self Activation
Complete the service installation yourself using the Openreach support system.
$0
$99/Mo
VAR Support
Can either be provided by a certified VAR Partner provided by OpenReach or a VAR Partner of your choice
Varies
$99/Mo
Enter Site Info
Select Activation Solution
Review And Place Your Order
Enter Credit Card Info
Select a Pricing Plan
Monthly
2930
Your Price depends on your bandwith. Select your Internet Access type
500 Kbps
2940
Total
Price $1,299
Service Charge $99/Mo
Recalculate
Reset
Help
Continue
Document: Done

FIG. 29

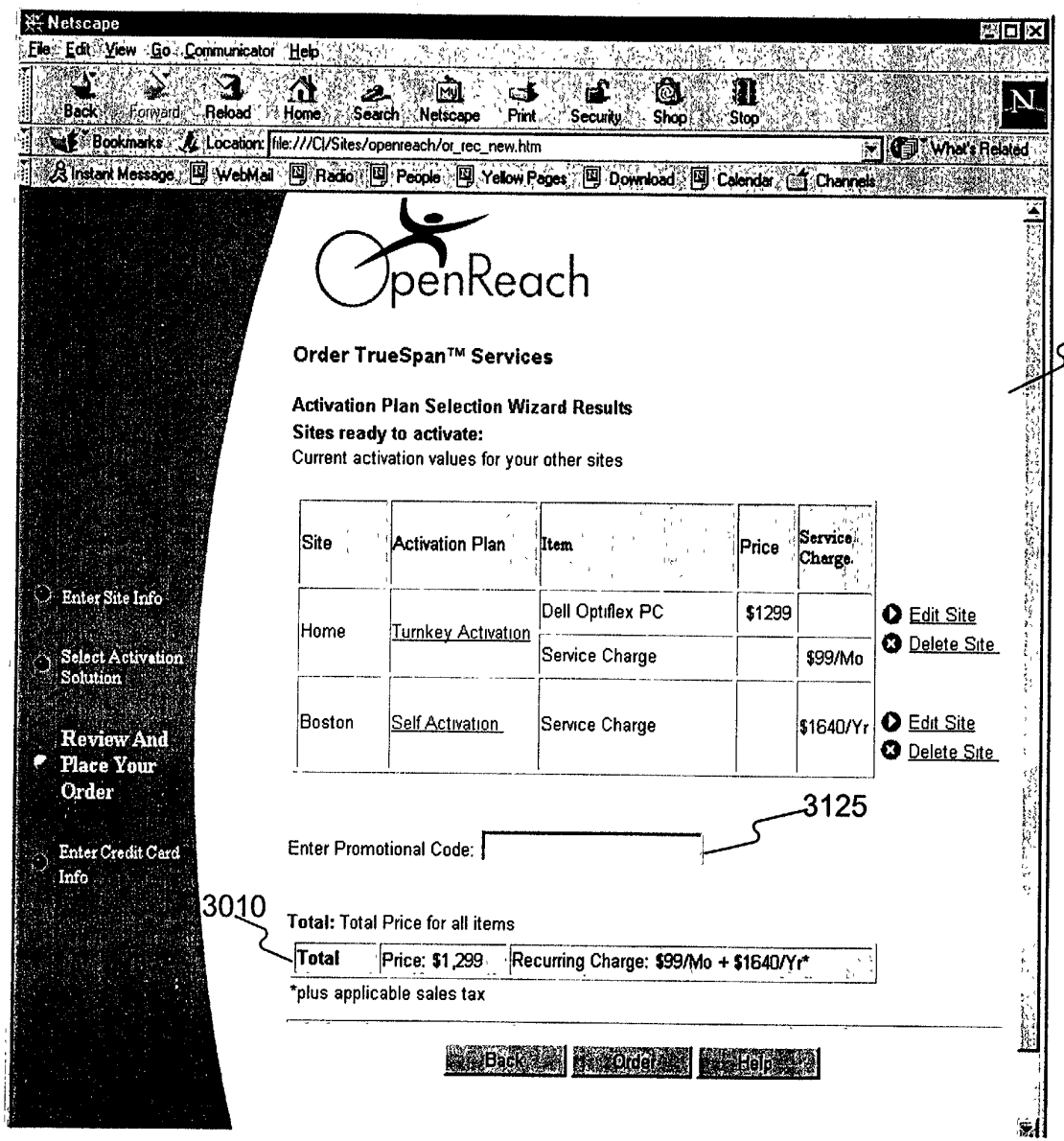

Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: file:///C|/Sites/openreach/or_rec_new.htm What's Related
Instant Message WebMail Radio People Yellow Pages Download Calendar Channels
OpenReach
3005
Order TrueSpan™ Services
Activation Plan Selection Wizard Results
Sites ready to activate:
Current activation values for your other sites
Site
Activation Plan
Item
Price
Service Charge
Home
Turnkey Activation
Dell Optiflex PC
$1299
Service Charge
$99/Mo
Edit Site
Delete Site
Boston
Self Activation
Service Charge
$1640/Yr
Edit Site
Delete Site
Enter Site Info
Select Activation Solution
Review And Place Your Order
Enter Credit Card Info
3125
Enter Promotional Code:
3010
Total: Total Price for all items
Total
Price: $1,299
Recurring Charge: $99/Mo + $1640/Yr*
*plus applicable sales tax
Back
Order
Help

FIG. 30

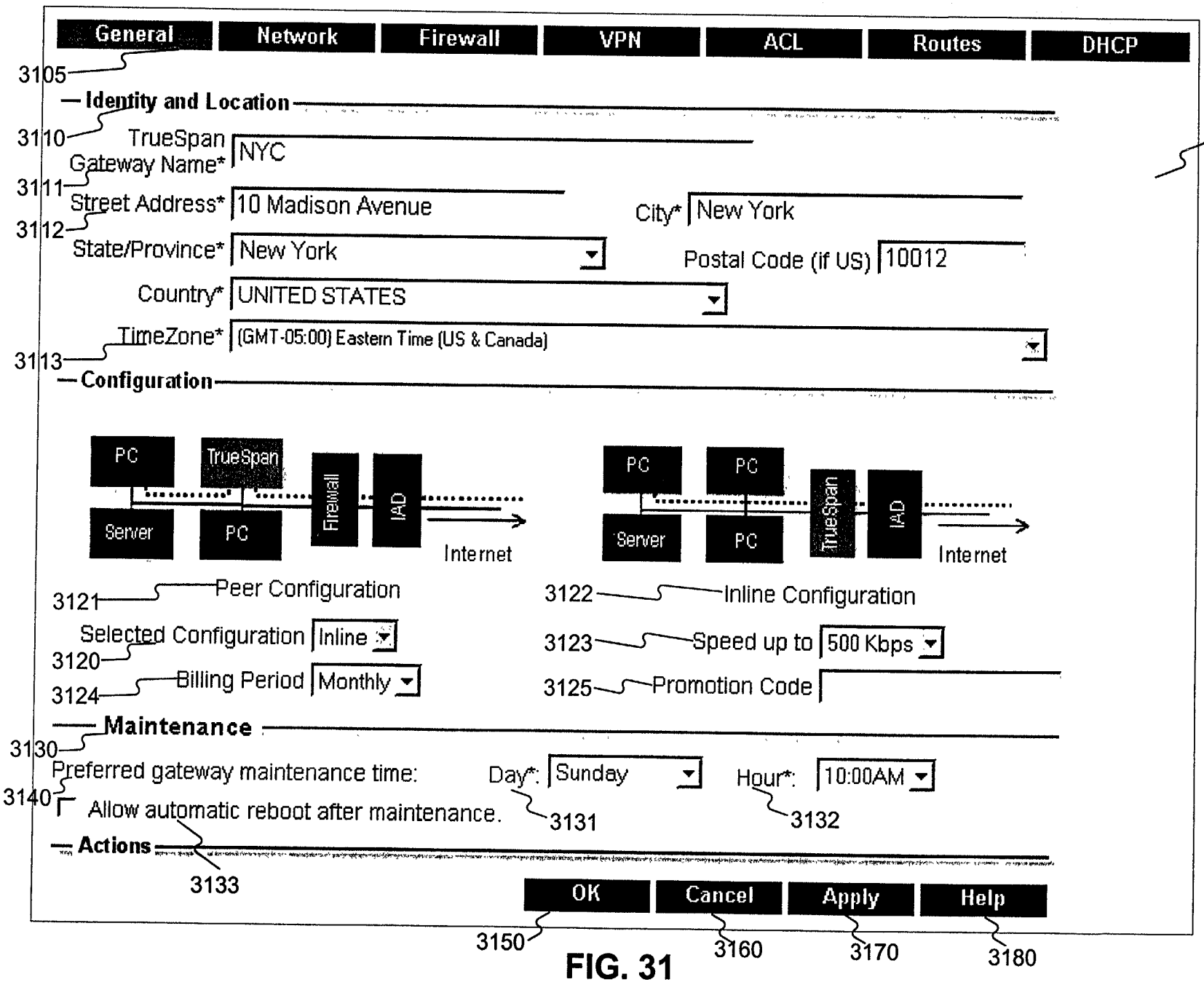

General
Network
Firewall
VPN
ACL
Routes
DHCP
3105
Identity and Location
3110
TrueSpan Gateway Name*
NYC
3101
3111
Street Address*
10 Madison Avenue
City*
New York
3112
State/Province*
New York
Postal Code (if US)
10012
Country*
UNITED STATES
TimeZone*
(GMT-05:00) Eastern Time (US & Canada)
3113
Configuration
PC
TrueSpan
Firewall
IAD
Server
PC
Internet
PC
PC
TrueSpan
IAD
Server
PC
Internet
3121
Peer Configuration
3122
Inline Configuration
Selected Configuration
Inline
3120
3123
Speed up to
500 Kbps
3124
Billing Period
Monthly
3125
Promotion Code
Maintenance
3130
Preferred gateway maintenance time:
Day*:
Sunday
Hour*:
10:00AM
3140
Allow automatic reboot after maintenance.
3131
3132
Actions
3133
OK
Cancel
Apply
Help
3150
3160
3170
3180

FIG. 31

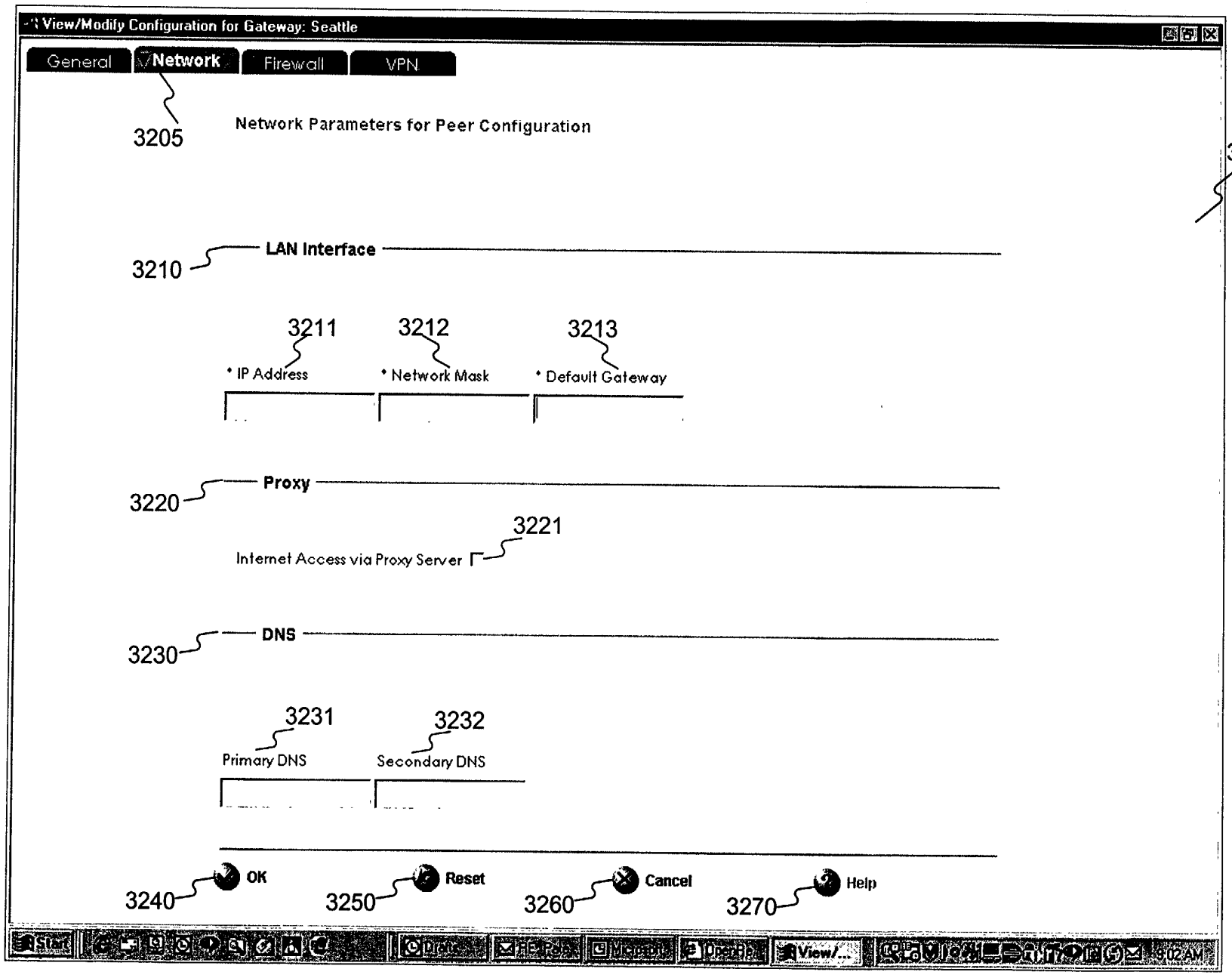

View/Modify Configuration for Gateway: Seattle
General
Network
Firewall
VPN
3205
Network Parameters for Peer Configuration
3275
3210
LAN Interface
3211
3212
3213
* IP Address
* Network Mask
* Default Gateway
3220
Proxy
3221
Internet Access via Proxy Server
3230
DNS
3231
3232
Primary DNS
Secondary DNS
3240
OK
3250
Reset
3260
Cancel
3270
Help

FIG. 32

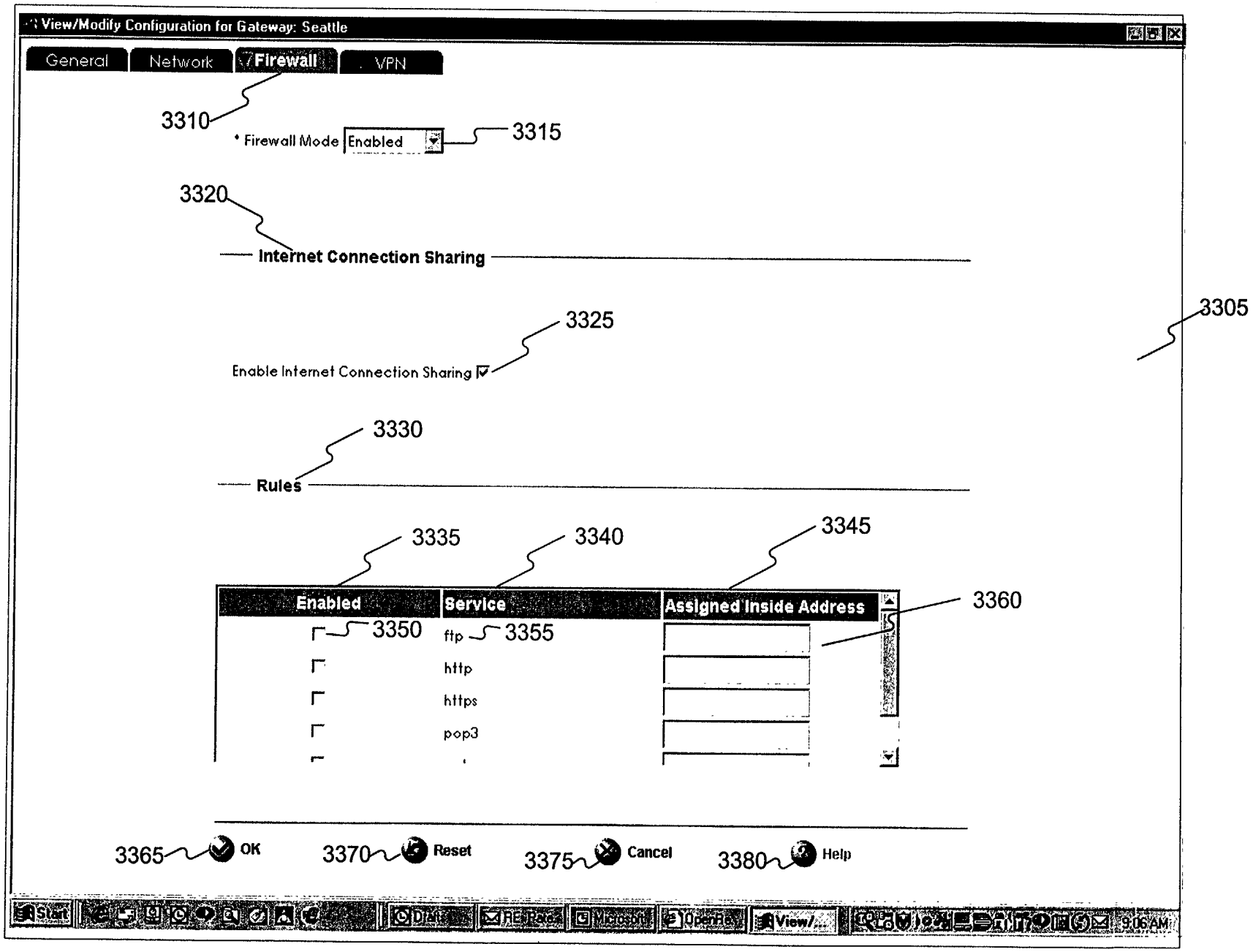

View/Modify Configuration for Gateway: Seattle
General
Network
Firewall
VPN
3310
* Firewall Mode
Enabled
3315
3320
Internet Connection Sharing
3305
3325
Enable Internet Connection Sharing
3330
Rules
3335
3340
3345
Enabled
Service
Assigned Inside Address
3360
3350
ftp
3355
http
https
pop3
3365
OK
3370
Reset
3375
Cancel
3380
Help
Start
9:06 AM

FIG. 33

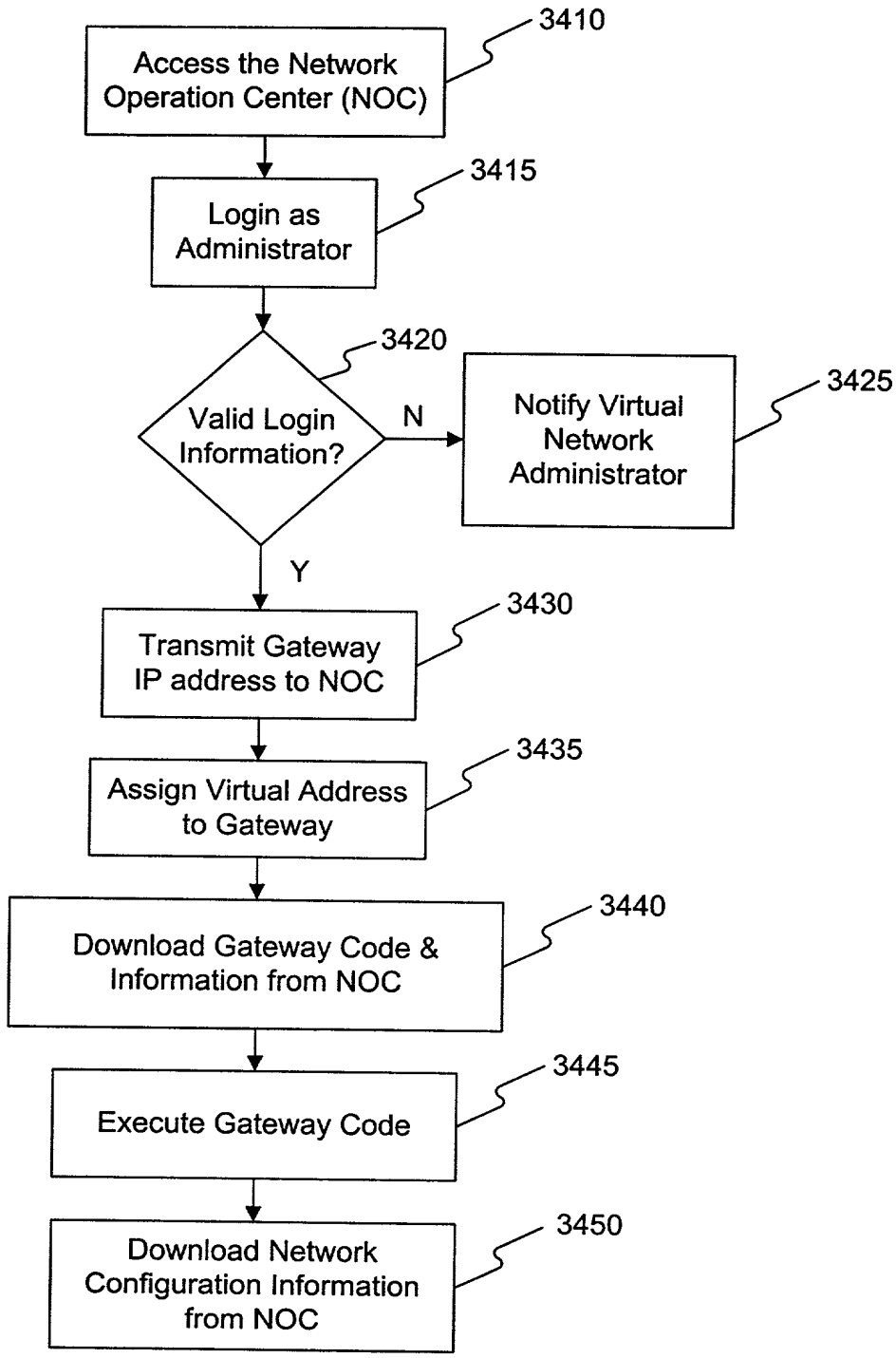

Access the Network Operation Center (NOC)
3410
Login as Administrator
3415
Valid Login Information?
3420
N
Notify Virtual Network Administrator
3425
Y
Transmit Gateway IP address to NOC
3430
Assign Virtual Address to Gateway
3435
Download Gateway Code & Information from NOC
3440
Execute Gateway Code
3445
Download Network Configuration Information from NOC
3450

FIG. 34

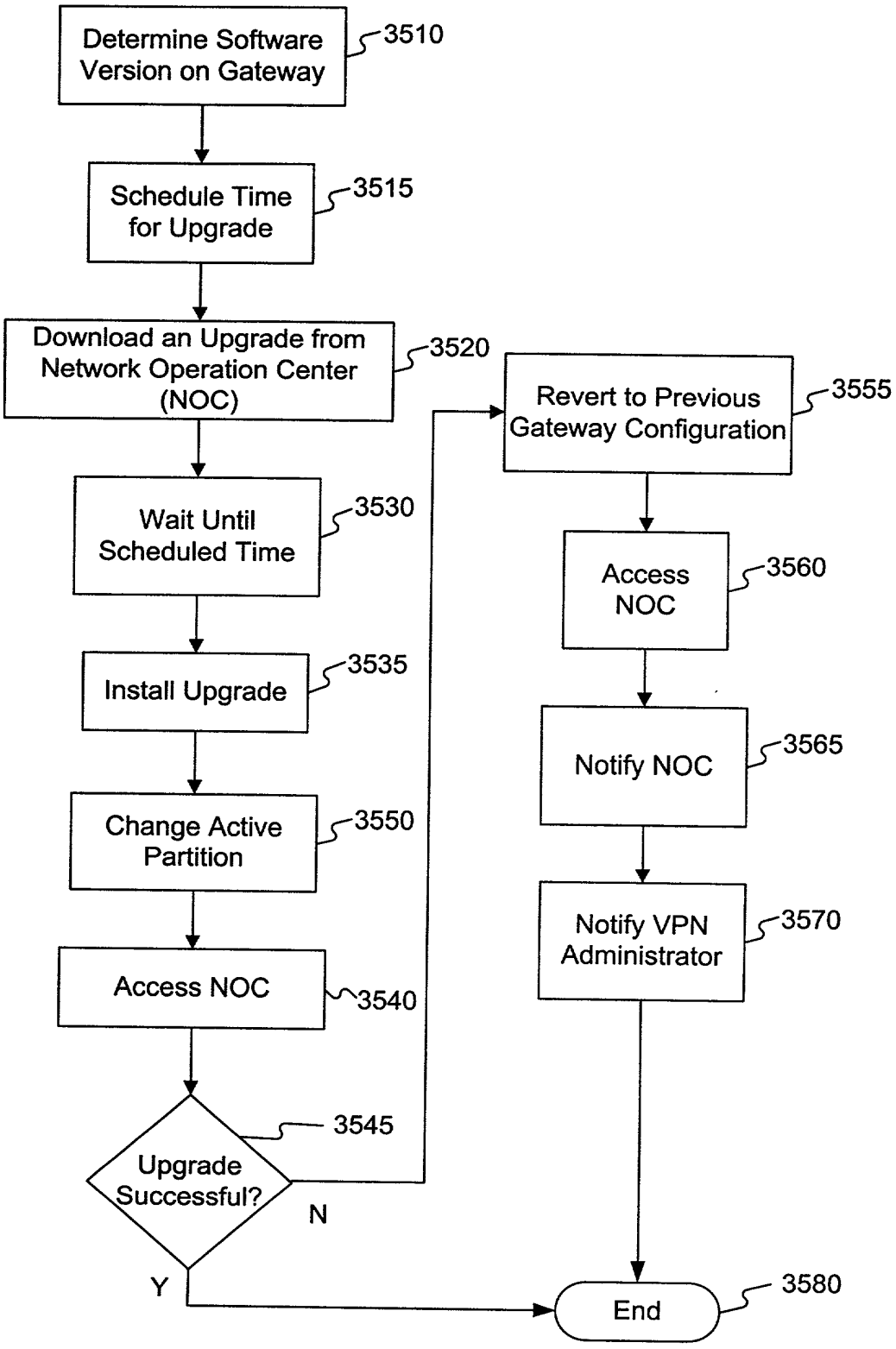

Determine Software Version on Gateway
3510
Schedule Time for Upgrade
3515
Download an Upgrade from Network Operation Center (NOC)
3520
Wait Until Scheduled Time
3530
Install Upgrade
3535
Change Active Partition
3550
Access NOC
3540
Upgrade Successful?
3545
N
Y
Revert to Previous Gateway Configuration
3555
Access NOC
3560
Notify NOC
3565
Notify VPN Administrator
3570
End
3580

FIG. 35

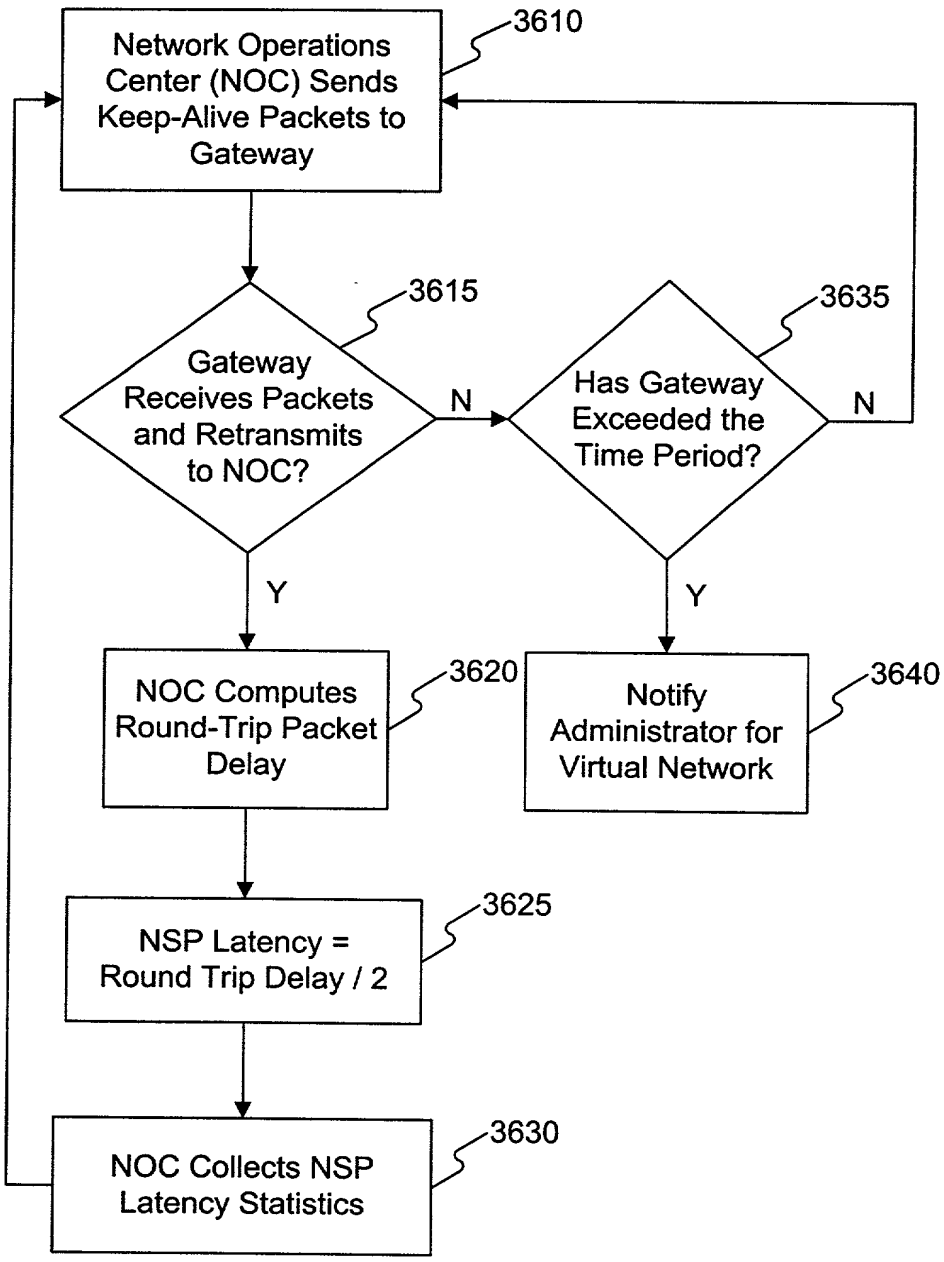

Network Operations Center (NOC) Sends Keep-Alive Packets to Gateway
3610
Gateway Receives Packets and Retransmits to NOC?
3615
N
Has Gateway Exceeded the Time Period?
3635
N
Y
Y
NOC Computes Round-Trip Packet Delay
3620
Notify Administrator for Virtual Network
3640
NSP Latency = Round Trip Delay / 2
3625
NOC Collects NSP Latency Statistics
3630

FIG. 36

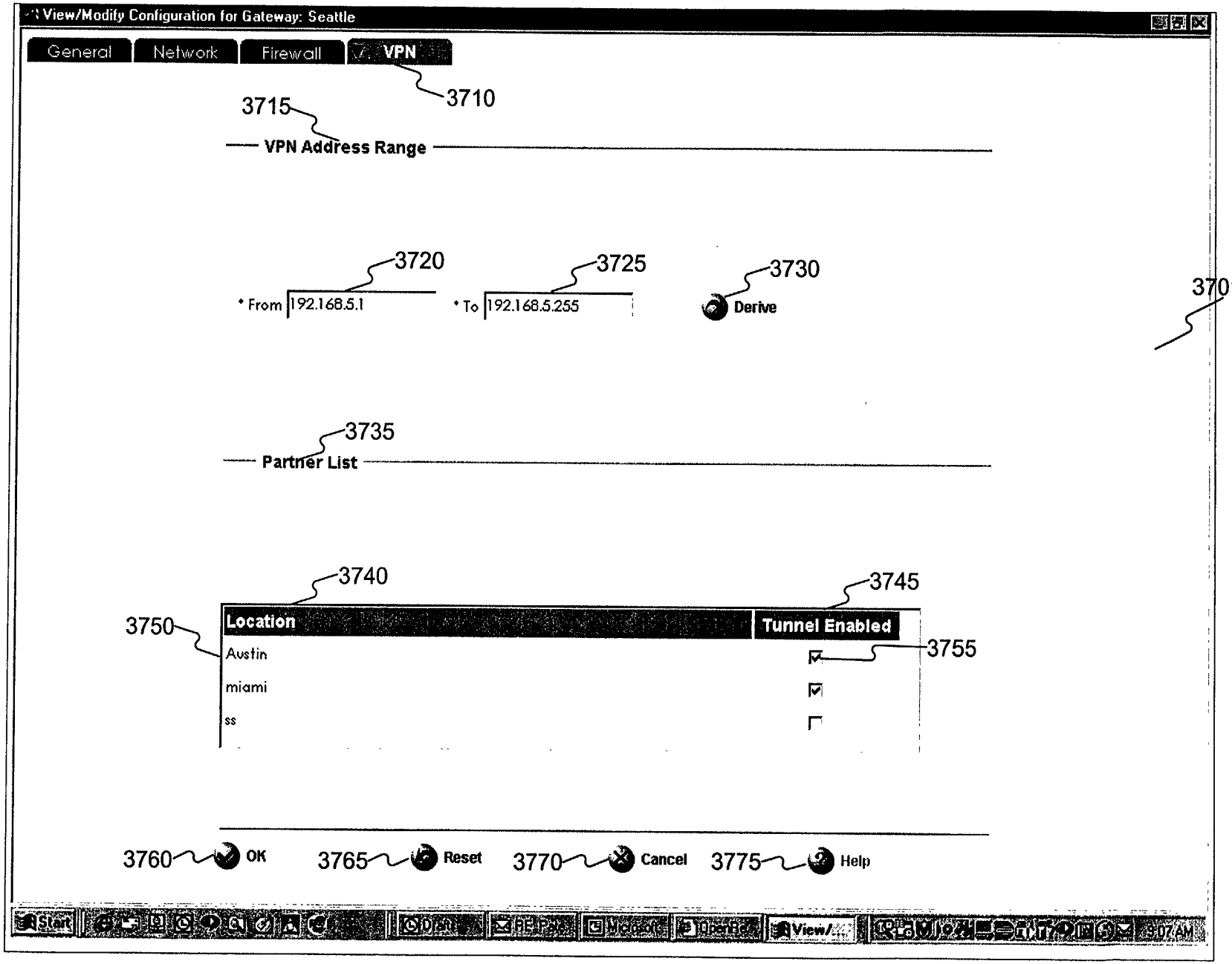

View/Modify Configuration for Gateway: Seattle
General
Network
Firewall
VPN
3710
3715
VPN Address Range
3720
3725
3730
3701
* From 192.168.5.1
* To 192.168.5.255
Derive
3735
Partner List
3740
3745
3750
Location
Tunnel Enabled
3755
Austin
miami
ss
3760
OK
3765
Reset
3770
Cancel
3775
Help

FIG. 37

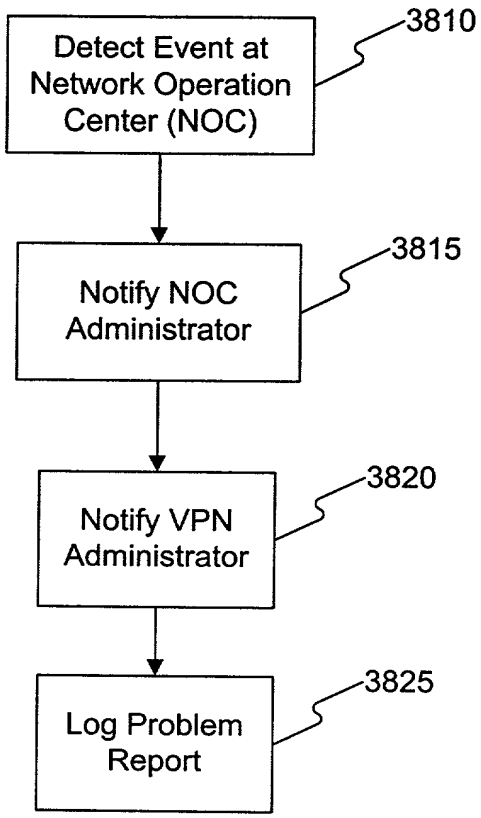

Detect Event at Network Operation Center (NOC)
3810
Notify NOC Administrator
3815
Notify VPN Administrator
3820
Log Problem Report
3825

FIG. 38

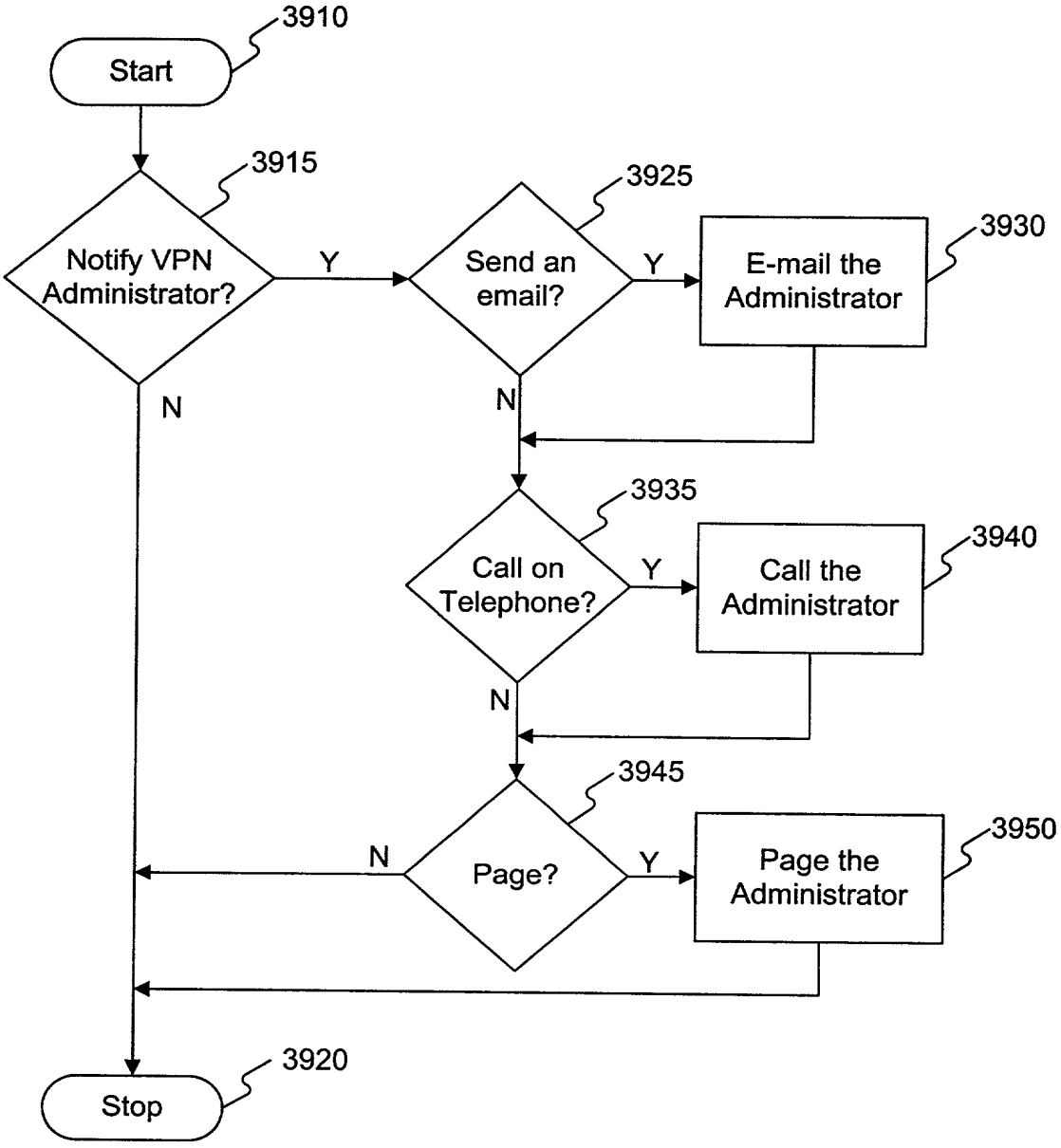

3910
Start
3915
Notify VPN Administrator?
Y
N
3925
Send an email?
Y
N
3930
E-mail the Administrator
3935
Call on Telephone?
Y
N
3940
Call the Administrator
3945
Page?
N
Y
3950
Page the Administrator
3920
Stop

FIG. 39

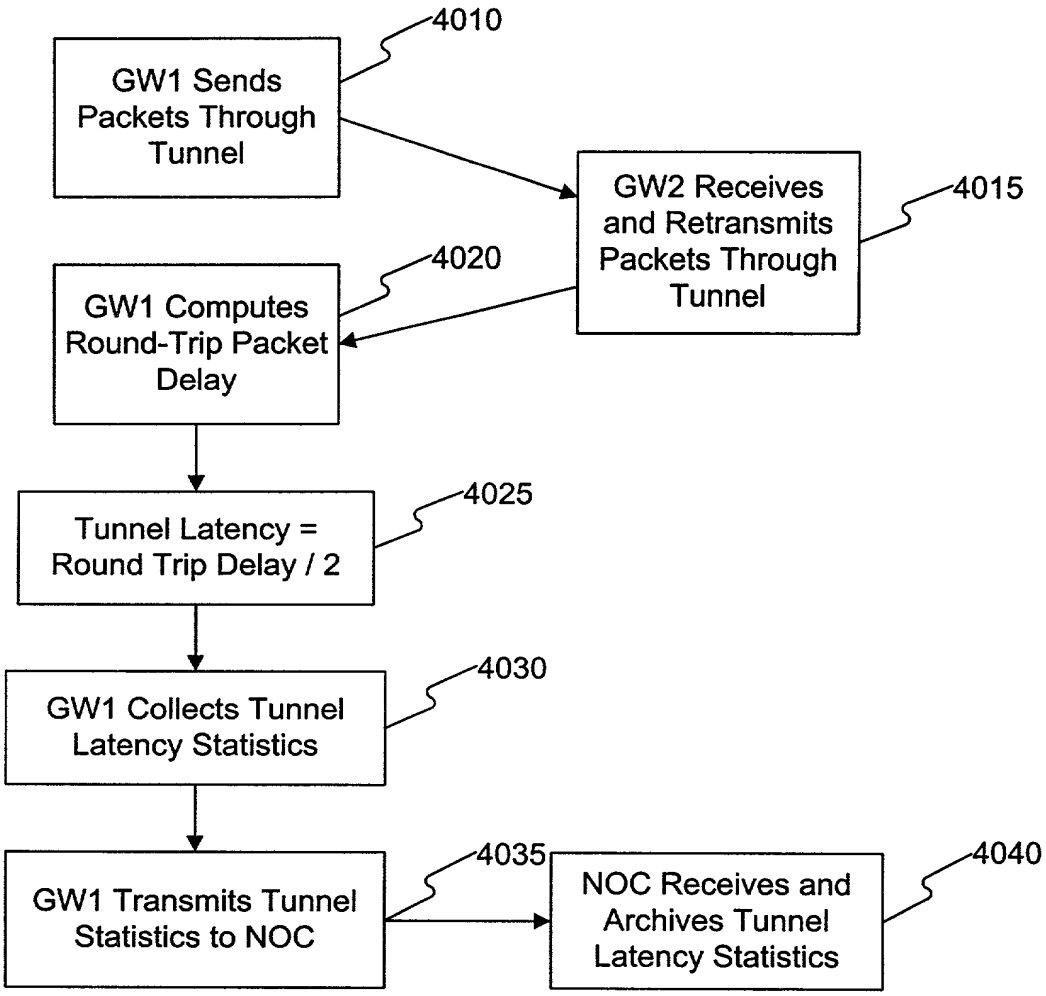

4010
GW1 Sends Packets Through Tunnel
GW2 Receives and Retransmits Packets Through Tunnel
4015
4020
GW1 Computes Round-Trip Packet Delay
4025
Tunnel Latency = Round Trip Delay / 2
4030
GW1 Collects Tunnel Latency Statistics
4035
GW1 Transmits Tunnel Statistics to NOC
NOC Receives and Archives Tunnel Latency Statistics
4040

FIG. 40

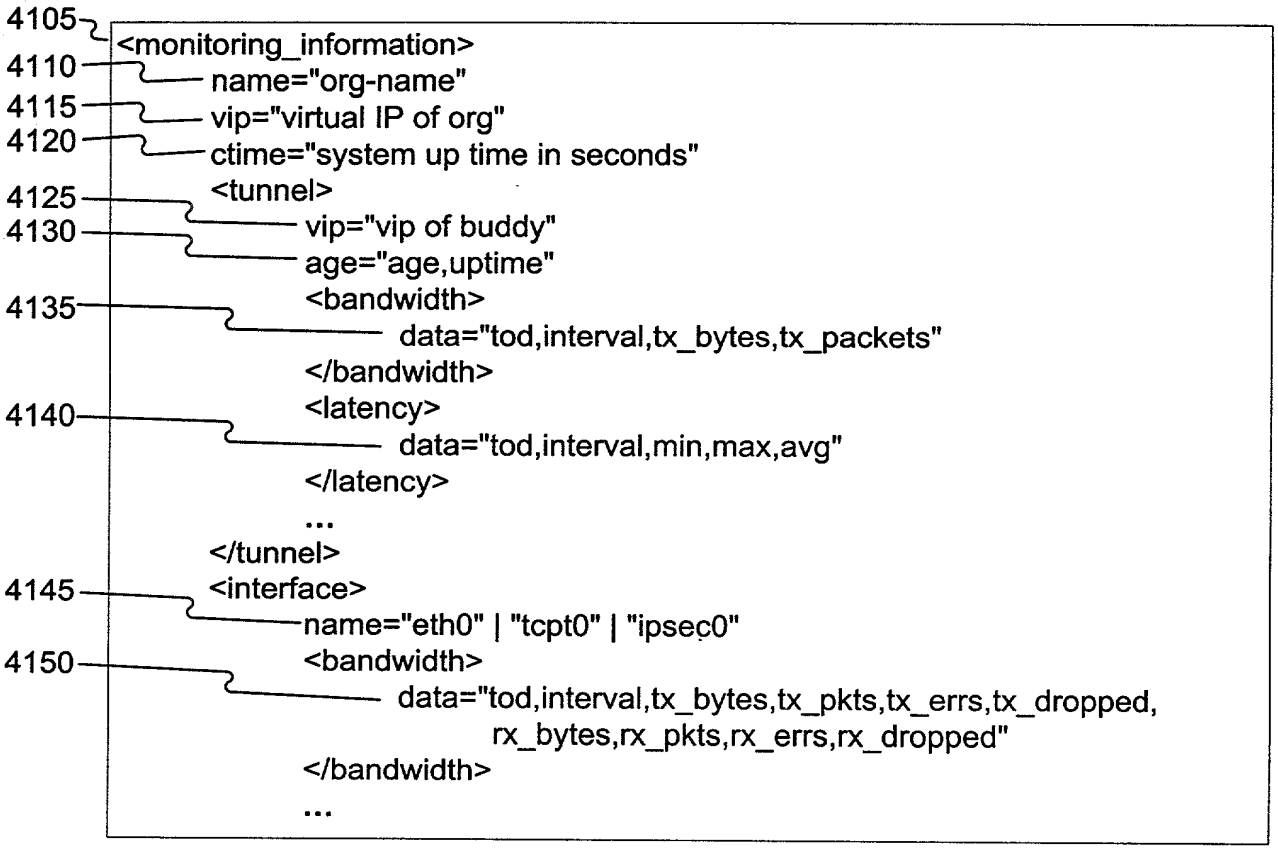
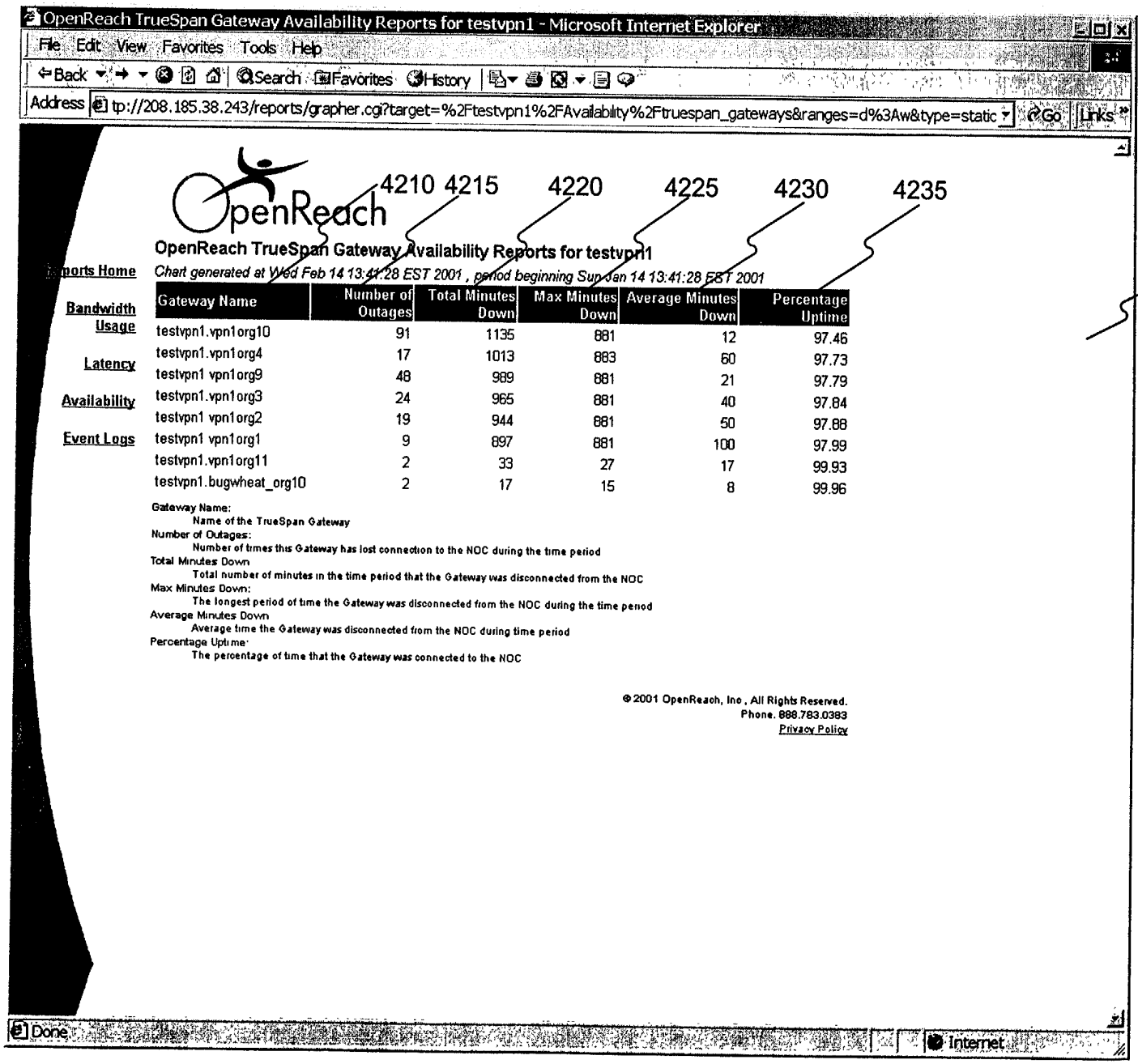

4105
<monitoring_information>
4110
name="org-name"
4115
vip="virtual IP of org"
4120
ctime="system up time in seconds"
<tunnel>
4125
vip="vip of buddy"
4130
age="age,uptime"
<bandwidth>
4135
data="tod,interval,tx_bytes,tx_packets"
</bandwidth>
<latency>
4140
data="tod,interval,min,max,avg"
</latency>
...
</tunnel>
<interface>
4145
name="eth0" | "tcpt0" | "ipsec0"
<bandwidth>
4150
data="tod,interval,tx_bytes,tx_pkts,tx_errs,tx_dropped,
rx_bytes,rx_pkts,rx_errs,rx_dropped"
</bandwidth>
...

FIG. 41


OpenReach TrueSpan Gateway Availability Reports for testvpn1 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address tp://208.185.38.243/reports/grapher.cgi?target=%2Ftestvpn1%2FAvailability%2Ftruespan_gateways&ranges=d%3Aw&type=static
Go Links
OpenReach
4210 4215 4220 4225 4230 4235
4205
OpenReach TrueSpan Gateway Availability Reports for testvpn1
Chart generated at Wed Feb 14 13:41:28 EST 2001 , period beginning Sun Jan 14 13:41:28 EST 2001
Reports Home
Bandwidth Usage
Latency
Availability
Event Logs
Gateway Name | Number of Outages | Total Minutes Down | Max Minutes Down | Average Minutes Down | Percentage Uptime
testvpn1.vpn1org10 | 91 | 1135 | 881 | 12 | 97.46
testvpn1.vpn1org4 | 17 | 1013 | 883 | 60 | 97.73
testvpn1 vpn1org9 | 48 | 989 | 881 | 21 | 97.79
testvpn1.vpn1org3 | 24 | 965 | 881 | 40 | 97.84
testvpn1 vpn1org2 | 19 | 944 | 881 | 50 | 97.88
testvpn1 vpn1org1 | 9 | 897 | 881 | 100 | 97.99
testvpn1.vpn1org11 | 2 | 33 | 27 | 17 | 99.93
testvpn1.bugwheat_org10 | 2 | 17 | 15 | 8 | 99.96
Gateway Name:
Name of the TrueSpan Gateway
Number of Outages:
Number of times this Gateway has lost connection to the NOC during the time period
Total Minutes Down
Total number of minutes in the time period that the Gateway was disconnected from the NOC
Max Minutes Down:
The longest period of time the Gateway was disconnected from the NOC during the time period
Average Minutes Down
Average time the Gateway was disconnected from the NOC during time period
Percentage Uptime
The percentage of time that the Gateway was connected to the NOC
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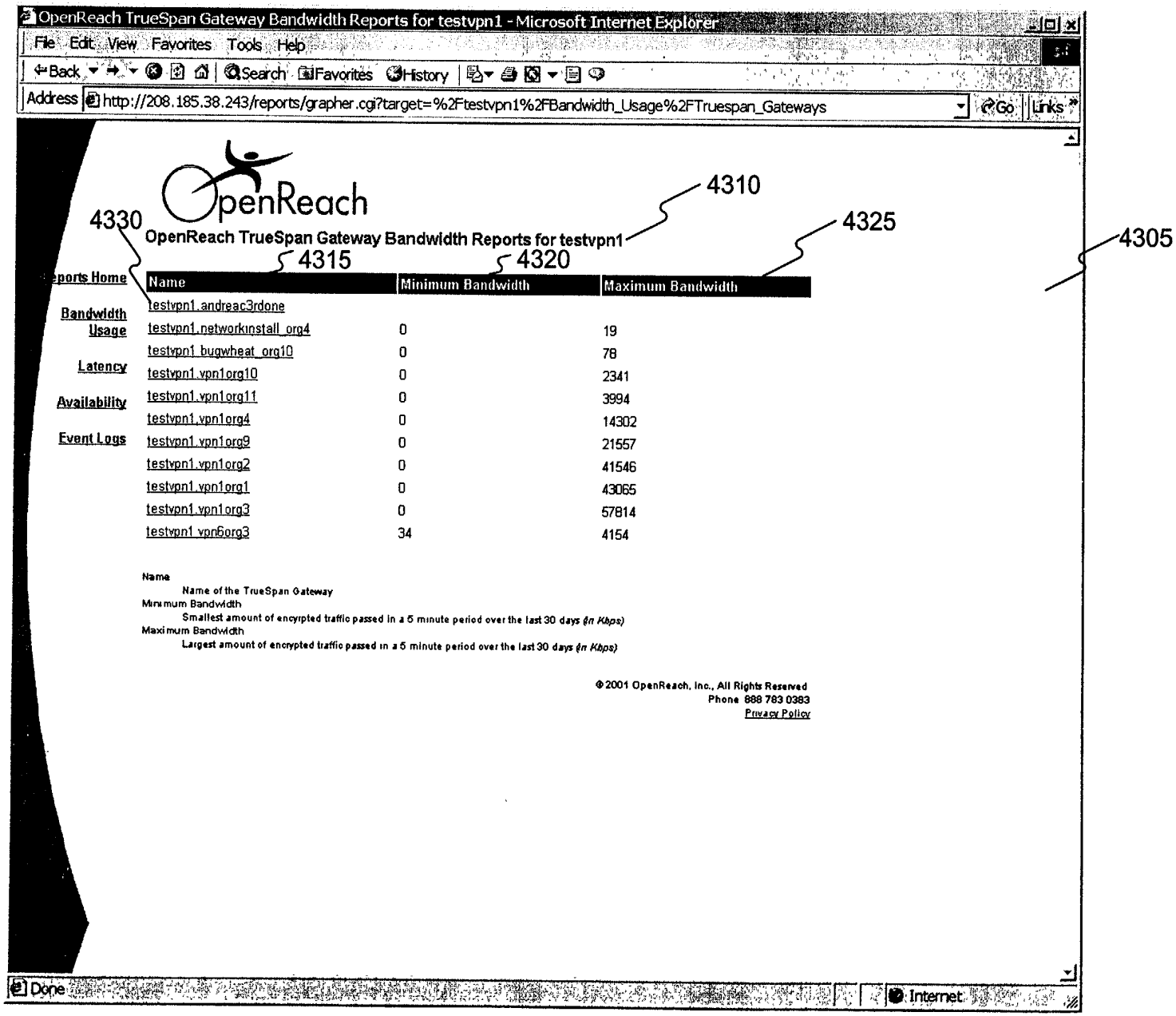
Phone. 888.783.0383
Privacy Policy
Done
Internet

FIG. 42


OpenReach TrueSpan Gateway Bandwidth Reports for testvpn1 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://208.185.38.243/reports/grapher.cgi?target=%2Ftestvpn1%2FBandwidth_Usage%2FTruespan_Gateways
Go Links
OpenReach
4310
4330
OpenReach TrueSpan Gateway Bandwidth Reports for testvpn1
4325
4305
4315
4320
eports Home
Bandwidth Usage
Latency
Availability
Event Logs
Name
Minimum Bandwidth
Maximum Bandwidth
testvpn1.andreac3rdone
testvpn1.networkinstall_org4 0 19
testvpn1.bugwheat_org10 0 78
testvpn1.vpn1org10 0 2341
testvpn1.vpn1org11 0 3994
testvpn1.vpn1org4 0 14302
testvpn1.vpn1org9 0 21557
testvpn1.vpn1org2 0 41546
testvpn1.vpn1org1 0 43065
testvpn1.vpn1org3 0 57814
testvpn1.vpn6org3 34 4154
Name
Name of the TrueSpan Gateway
Minimum Bandwidth
Smallest amount of encrypted traffic passed in a 5 minute period over the last 30 days (in Kbps)
Maximum Bandwidth
Largest amount of encrypted traffic passed in a 5 minute period over the last 30 days (in Kbps)
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Phone 888 783 0383
Privacy Policy
Done
Internet

FIG. 43

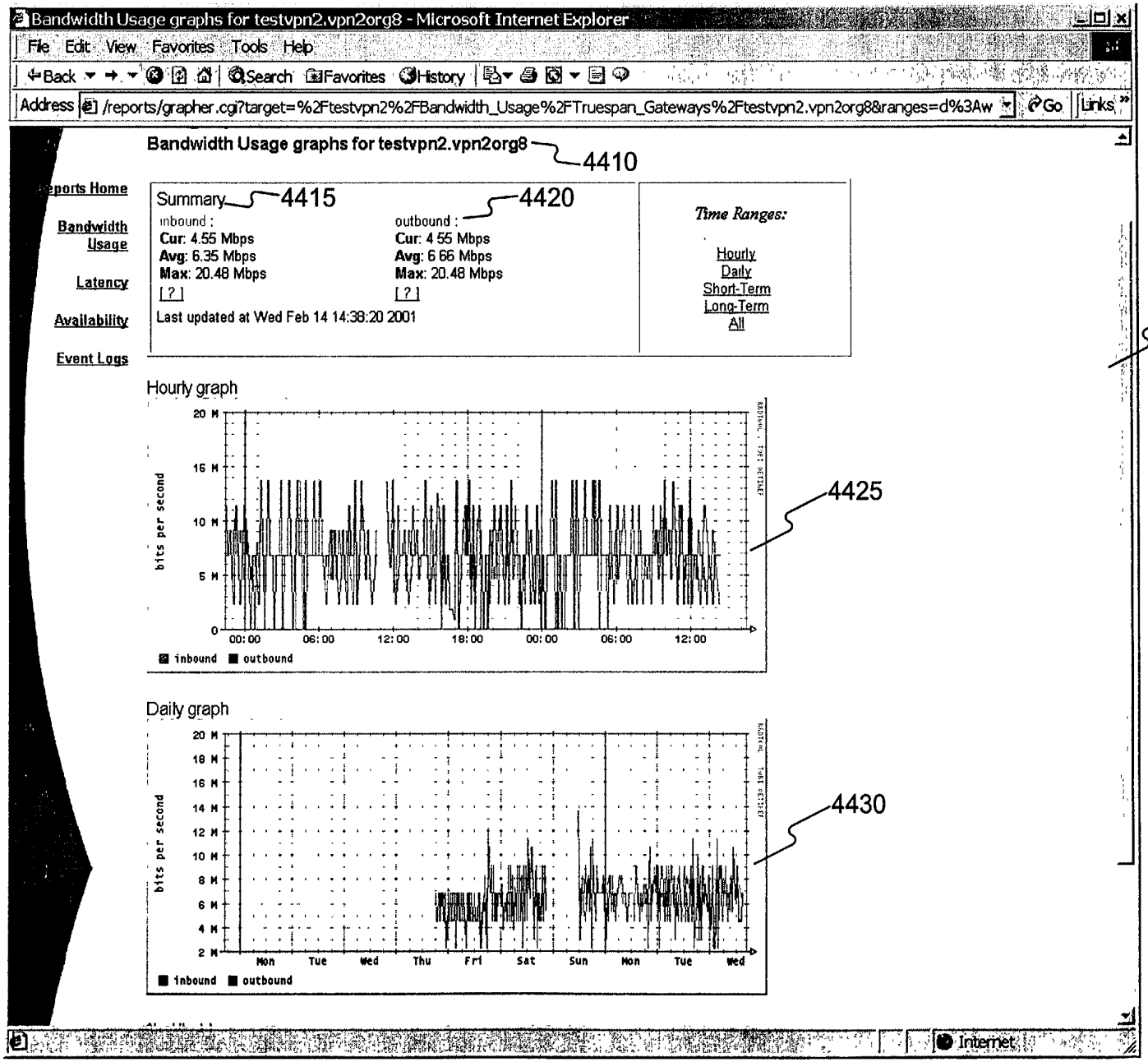
Bandwidth Usage graphs for testvpn2.vpn2org8 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address /reports/grapher.cgi?target=%2Ftestvpn2%2FBandwidth_Usage%2FTruespan_Gateways%2Ftestvpn2.vpn2org8&ranges=d%3Aw
Go Links
Bandwidth Usage graphs for testvpn2.vpn2org8
4410
eports Home
Bandwidth Usage
Latency
Availability
Event Logs
Summary
4415
4420
inbound :
Cur: 4.55 Mbps
Avg: 6.35 Mbps
Max: 20.48 Mbps
[?]
outbound :
Cur: 4.55 Mbps
Avg: 6.66 Mbps
Max: 20.48 Mbps
[?]
Last updated at Wed Feb 14 14:38:20 2001
Time Ranges:
Hourly
Daily
Short-Term
Long-Term
All
4405
Hourly graph
20 M
15 M
10 M
5 M
0
bits per second
00:00
06:00
12:00
18:00
00:00
06:00
12:00
inbound
outbound
4425
Daily graph
20 M
18 M
16 M
14 M
12 M
10 M
8 M
6 M
4 M
2 M
bits per second
Mon
Tue
Wed
Thu
Fri
Sat
Sun
Mon
Tue
Wed
inbound
outbound
4430
Internet

FIG. 44

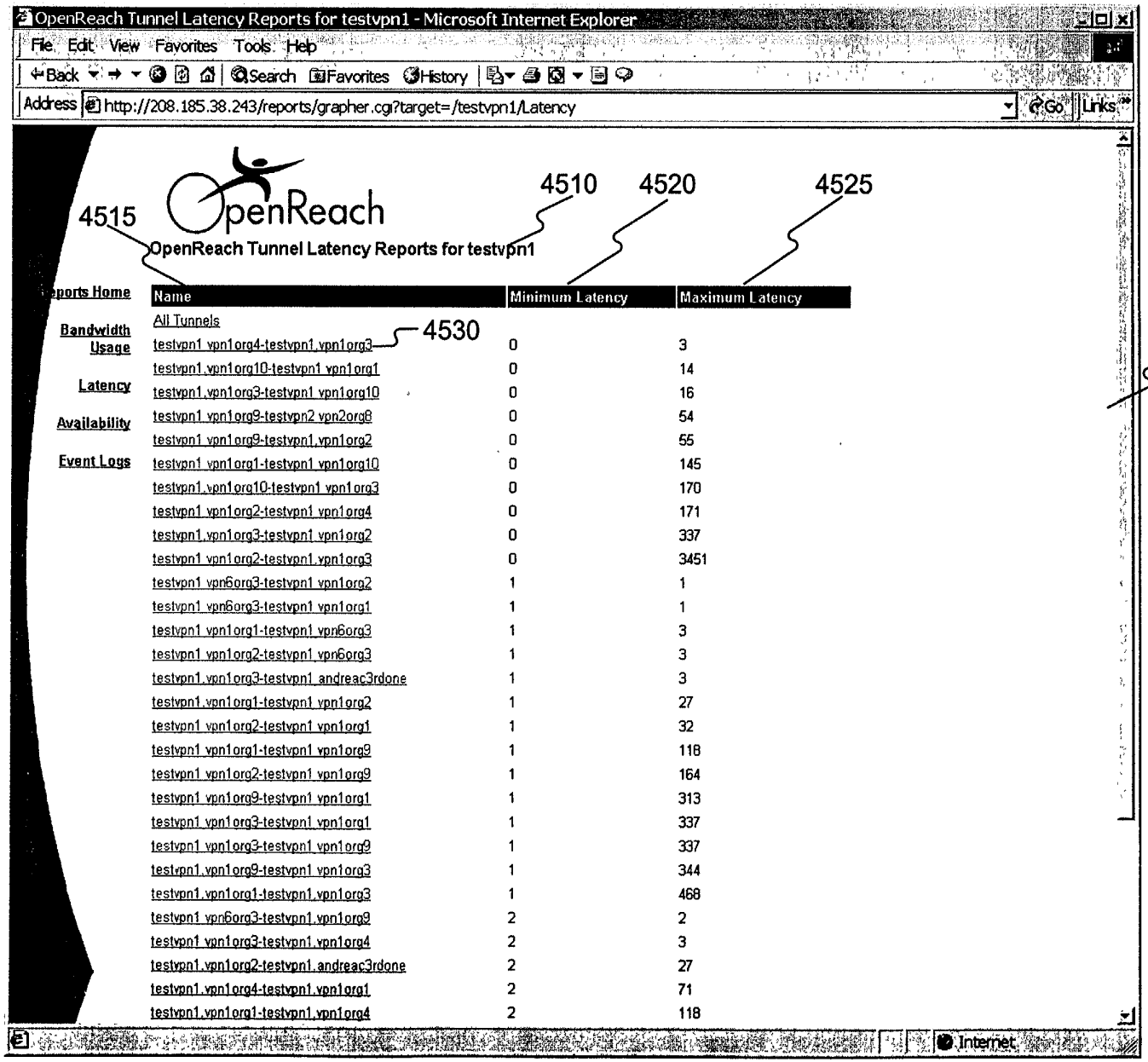
OpenReach Tunnel Latency Reports for testvpn1 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://208.185.38.243/reports/grapher.cgi?target=/testvpn1/Latency
Go Links
OpenReach
4515
4510
4520
4525
4505
4530
OpenReach Tunnel Latency Reports for testvpn1
Reports Home
Bandwidth Usage
Latency
Availability
Event Logs
Name
Minimum Latency
Maximum Latency
All Tunnels
testvpn1.vpn1org4-testvpn1.vpn1org3 0 3
testvpn1.vpn1org10-testvpn1.vpn1org1 0 14
testvpn1.vpn1org3-testvpn1.vpn1org10 0 16
testvpn1.vpn1org9-testvpn2.vpn2org8 0 54
testvpn1.vpn1org9-testvpn1.vpn1org2 0 55
testvpn1.vpn1org1-testvpn1.vpn1org10 0 145
testvpn1.vpn1org10-testvpn1.vpn1org3 0 170
testvpn1.vpn1org2-testvpn1.vpn1org4 0 171
testvpn1.vpn1org3-testvpn1.vpn1org2 0 337
testvpn1.vpn1org2-testvpn1.vpn1org3 0 3451
testvpn1.vpn6org3-testvpn1.vpn1org2 1 1
testvpn1.vpn6org3-testvpn1.vpn1org1 1 1
testvpn1.vpn1org1-testvpn1.vpn6org3 1 3
testvpn1.vpn1org2-testvpn1.vpn6org3 1 3
testvpn1.vpn1org3-testvpn1.andreac3rdone 1 3
testvpn1.vpn1org1-testvpn1.vpn1org2 1 27
testvpn1.vpn1org2-testvpn1.vpn1org1 1 32
testvpn1.vpn1org1-testvpn1.vpn1org9 1 118
testvpn1.vpn1org2-testvpn1.vpn1org9 1 164
testvpn1.vpn1org9-testvpn1.vpn1org1 1 313
testvpn1.vpn1org3-testvpn1.vpn1org1 1 337
testvpn1.vpn1org3-testvpn1.vpn1org9 1 337
testvpn1.vpn1org9-testvpn1.vpn1org3 1 344
testvpn1.vpn1org1-testvpn1.vpn1org3 1 468
testvpn1.vpn6org3-testvpn1.vpn1org9 2 2
testvpn1.vpn1org3-testvpn1.vpn1org4 2 3
testvpn1.vpn1org2-testvpn1.andreac3rdone 2 27
testvpn1.vpn1org4-testvpn1.vpn1org1 2 71
testvpn1.vpn1org1-testvpn1.vpn1org4 2 118
Internet

FIG. 45

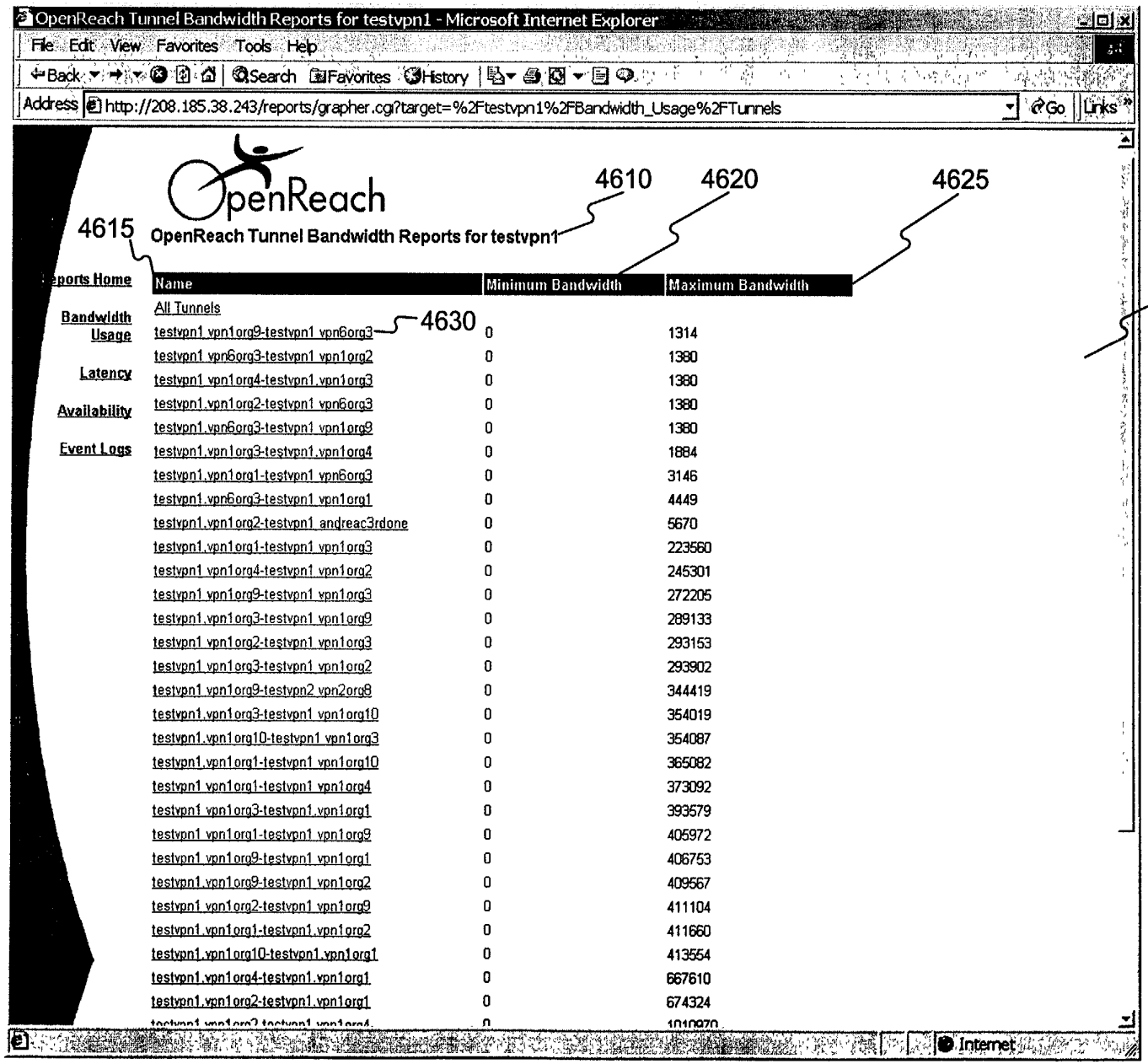
OpenReach Tunnel Bandwidth Reports for testvpn1 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://208.185.38.243/reports/grapher.cgi?target=%2Ftestvpn1%2FBandwidth_Usage%2FTunnels
Go Links
OpenReach
OpenReach Tunnel Bandwidth Reports for testvpn1
4610
4620
4625
4615
4605
4630
eports Home
Bandwidth Usage
Latency
Availability
Event Logs
Name
Minimum Bandwidth
Maximum Bandwidth
All Tunnels
testvpn1.vpn1org9-testvpn1.vpn6org3 0 1314
testvpn1.vpn6org3-testvpn1.vpn1org2 0 1380
testvpn1.vpn1org4-testvpn1.vpn1org3 0 1380
testvpn1.vpn1org2-testvpn1.vpn6org3 0 1380
testvpn1.vpn6org3-testvpn1.vpn1org9 0 1380
testvpn1.vpn1org3-testvpn1.vpn1org4 0 1884
testvpn1.vpn1org1-testvpn1.vpn6org3 0 3146
testvpn1.vpn6org3-testvpn1.vpn1org1 0 4449
testvpn1.vpn1org2-testvpn1.andreac3rdone 0 5670
testvpn1.vpn1org1-testvpn1.vpn1org3 0 223560
testvpn1.vpn1org4-testvpn1.vpn1org2 0 245301
testvpn1.vpn1org9-testvpn1.vpn1org3 0 272205
testvpn1.vpn1org3-testvpn1.vpn1org9 0 289133
testvpn1.vpn1org2-testvpn1.vpn1org3 0 293153
testvpn1.vpn1org3-testvpn1.vpn1org2 0 293902
testvpn1.vpn1org9-testvpn2.vpn2org8 0 344419
testvpn1.vpn1org3-testvpn1.vpn1org10 0 354019
testvpn1.vpn1org10-testvpn1.vpn1org3 0 354087
testvpn1.vpn1org1-testvpn1.vpn1org10 0 365082
testvpn1.vpn1org1-testvpn1.vpn1org4 0 373092
testvpn1.vpn1org3-testvpn1.vpn1org1 0 393579
testvpn1.vpn1org1-testvpn1.vpn1org9 0 405972
testvpn1.vpn1org9-testvpn1.vpn1org1 0 406753
testvpn1.vpn1org9-testvpn1.vpn1org2 0 409567
testvpn1.vpn1org2-testvpn1.vpn1org9 0 411104
testvpn1.vpn1org1-testvpn1.vpn1org2 0 411660
testvpn1.vpn1org10-testvpn1.vpn1org1 0 413554
testvpn1.vpn1org4-testvpn1.vpn1org1 0 667610
testvpn1.vpn1org2-testvpn1.vpn1org1 0 674324
Internet

FIG. 46

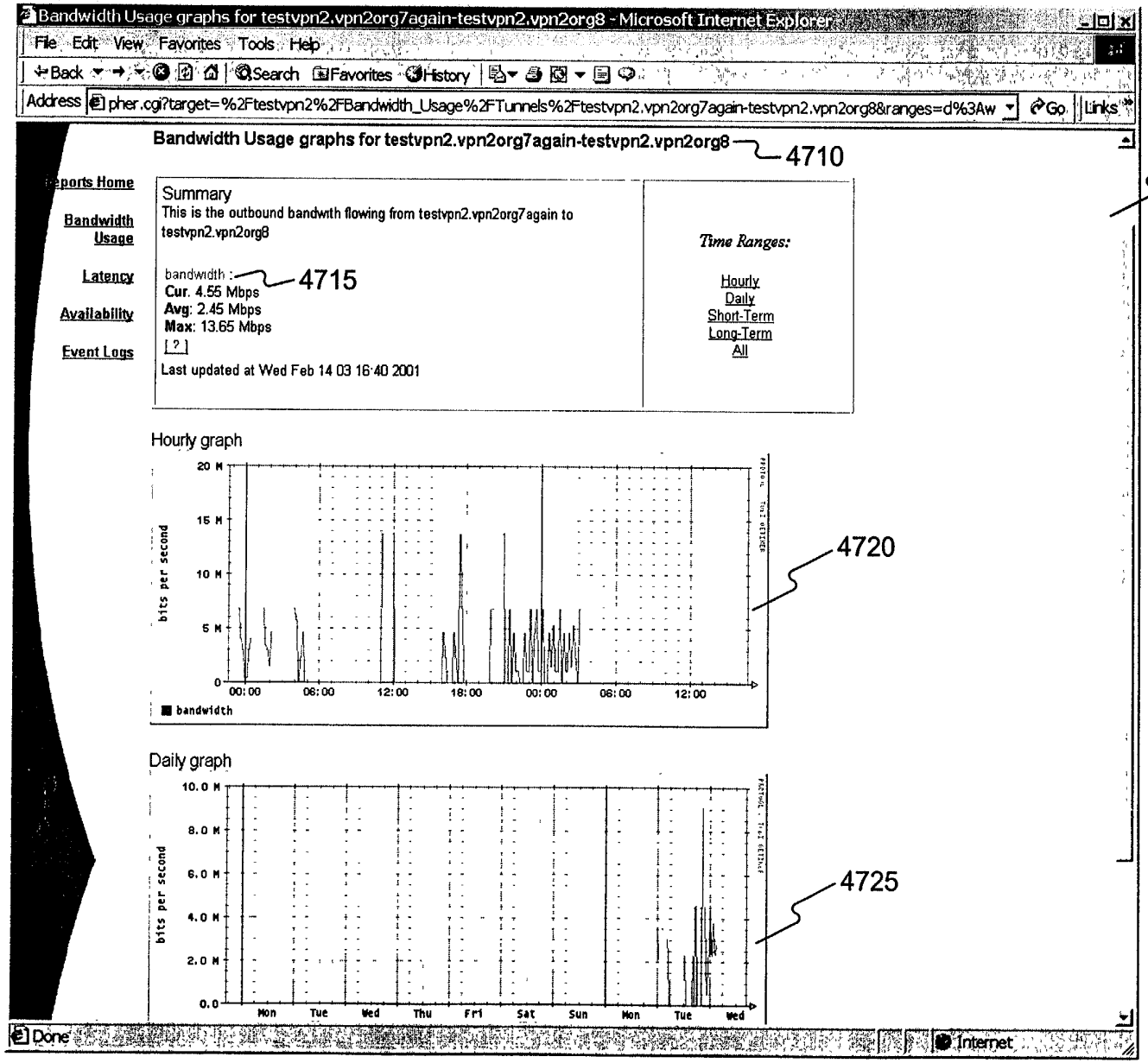
Bandwidth Usage graphs for testvpn2.vpn2org7again-testvpn2.vpn2org8 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address pher.cgi?target=%2Ftestvpn2%2FBandwidth_Usage%2FTunnels%2Ftestvpn2.vpn2org7again-testvpn2.vpn2org8&ranges=d%3Aw
Go Links
Bandwidth Usage graphs for testvpn2.vpn2org7again-testvpn2.vpn2org8
4710
4705
eports Home
Bandwidth Usage
Latency
Availability
Event Logs
Summary
This is the outbound bandwith flowing from testvpn2.vpn2org7again to testvpn2.vpn2org8
bandwidth :
4715
Cur. 4.55 Mbps
Avg: 2.45 Mbps
Max: 13.65 Mbps
[?]
Last updated at Wed Feb 14 03 16:40 2001
Time Ranges:
Hourly
Daily
Short-Term
Long-Term
All
Hourly graph
20 M
15 M
10 M
5 M
0
bits per second
00:00
06:00
12:00
18:00
00:00
06:00
12:00
bandwidth
4720
Daily graph
10.0 M
8.0 M
6.0 M
4.0 M
2.0 M
0.0
bits per second
Mon
Tue
Wed
Thu
Fri
Sat
Sun
Mon
Tue
Wed
4725
Done
Internet

FIG. 47

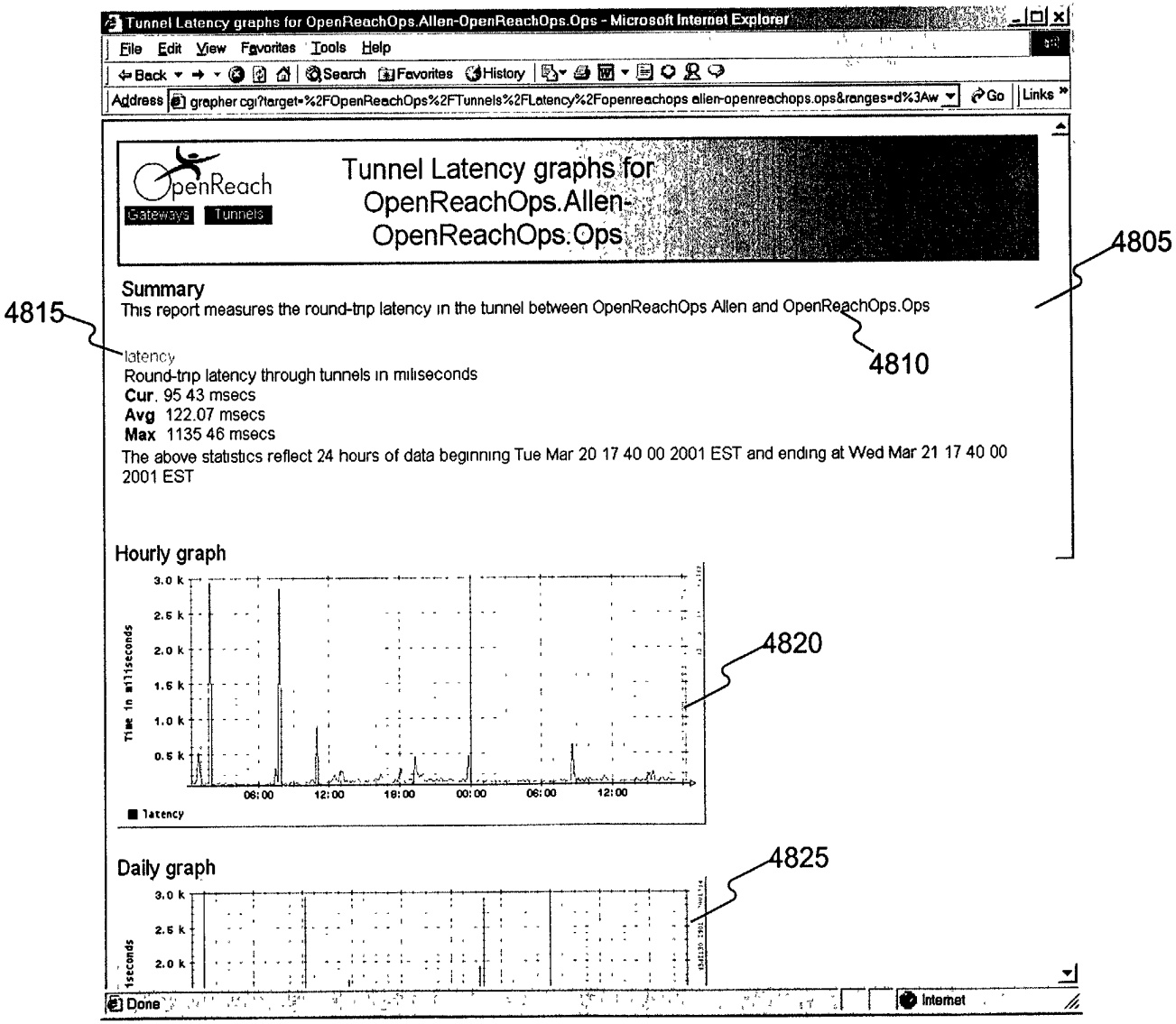
Tunnel Latency graphs for OpenReachOps.Allen-OpenReachOps.Ops - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address grapher.cgi?target=%2FOpenReachOps%2FTunnels%2FLatency%2Fopenreachops.allen-openreachops.ops&ranges=d%3Aw
Go Links
OpenReach
Gateways Tunnels
Tunnel Latency graphs for OpenReachOps.Allen-OpenReachOps.Ops
4805
Summary
This report measures the round-trip latency in the tunnel between OpenReachOps.Allen and OpenReachOps.Ops
4815
4810
latency
Round-trip latency through tunnels in miliseconds
Cur. 95.43 msecs
Avg 122.07 msecs
Max 1135.46 msecs
The above statistics reflect 24 hours of data beginning Tue Mar 20 17:40:00 2001 EST and ending at Wed Mar 21 17:40:00 2001 EST
Hourly graph
3.0 k
2.5 k
2.0 k
1.5 k
1.0 k
0.5 k
Time in milliseconds
08:00 12:00 16:00 00:00 06:00 12:00
latency
4820
Daily graph
4825
Done
Internet

FIG. 48